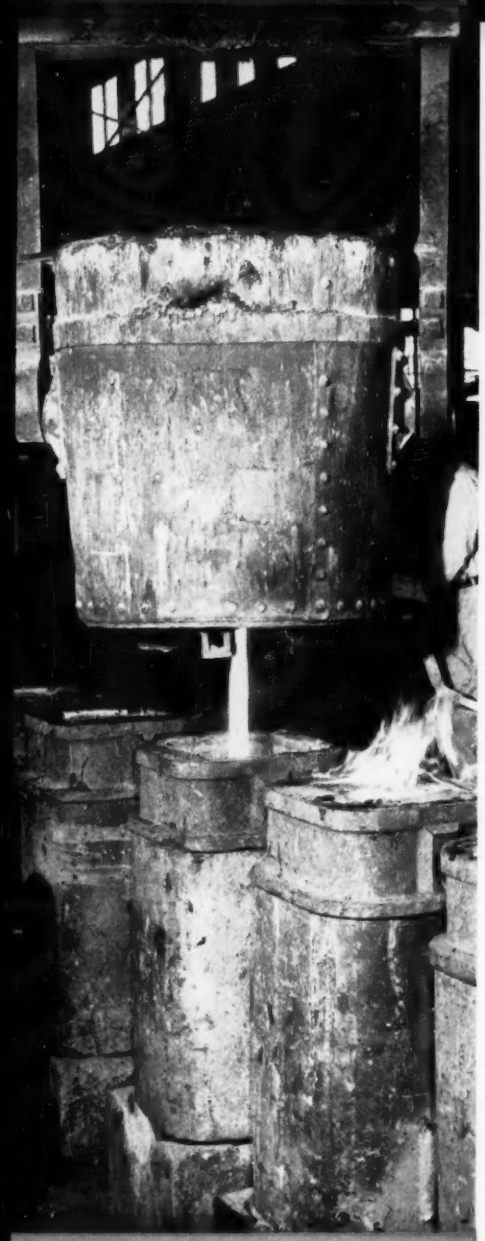

OCTOBER 19, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Steel Strike Forcing More Cutbacks

More Companies—Even Small Ones—Look into Operations Research

Chrysler Reduces Its 'Waste Line'

How to Identify Good Hot Work Die

Switch to Resulfurized Steel Lowers Automotive Part Costs

Steelmaker Adds Plastic Coating Line

Nickel Fights Back From Sales Slump

U. S. consumption will hit 210 million lb this year vs. 160 million last year. Had there been no steel strike, usage would have soared to around 260 million lb—for a near record year. Total Free World consumption this year should jump to around 400 million lb, 80 million better than last year. The gain comes partly from improved marketing (Page 102).

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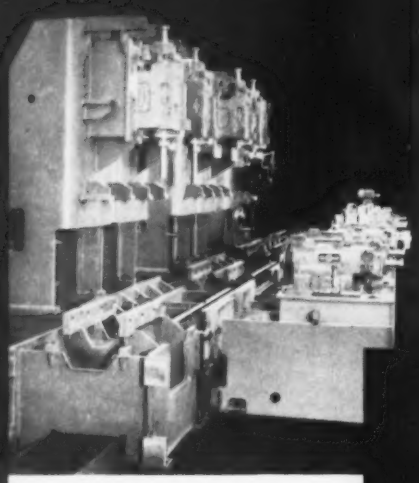
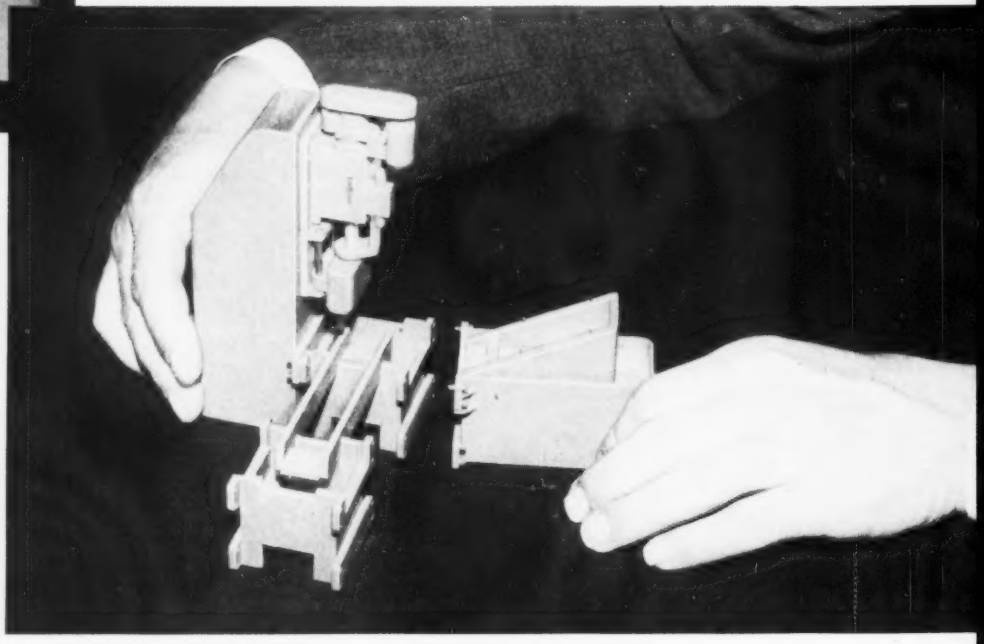
BUILDING-BLOCK AUTOMATION...



This 15-station Model S Bore-Matic, in process of assembly at Heald, shows the application of standard base and wing components for vertical and horizontal mounting of 20 Heald BORIZERS. Machine will perform 174 drilling, spot drilling, tapping, spot facing, core drilling, reaming and gun drilling operations on automotive transmission valve bodies.

Scale model of standard building-block units for automated Borizing equipment, showing two center sections, a vertical column with BORIZER in position and a horizontal wing base with angular column for BORIZER mounting.



It's **HERE**, at HEALD, right now!

WHETHER you call it "modular construction" or "building-block design," it's already an accomplished fact at Heald.

Recognizing that standardization of components for automated Borizing equipment can effect *substantial savings* in initial cost and job changeovers, Heald has designed and built standard center sections, wing bases, angular raising blocks, vertical columns and slide units which can be integrated to perform virtually any combination of roughing, semi-finishing and finishing operations. The Heald system of basic components is fully compatible with the proposed new INDUSTRY STANDARDS, which mark a major advance in the application of automated production equipment.

These standard components are ideally suited to the use of Heald BORIZERS, tooled to the requirements of any job. Changeovers are simply a matter of replacing or adding basic units, modifying workholding equipment if required, and retooling the BORIZERS. Completely self-contained Heald Red Head BORIZERS, providing flexible control of feeds and speeds, simplify retooling and recycling, permitting the most versatile building-block arrangement obtainable.

Ask your Heald engineer to schedule a scale-model demonstration of the new modular design.

It PAYS to come to Heald

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago . Cleveland . Dayton . Detroit . Indianapolis . Syracuse . New York

HEALD

This Week in STEEL

The Metalworking Weekly

October 19, 1959 Vol. 145—No. 16

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Index available semiannually.

STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED OCT. 10	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	117†	117	103	139

†Preliminary.

Since the steel strike period low of 103 a month ago, STEEL's industrial production index has climbed 14 points, mostly on the strength of the new car buildup. It will continue to climb gradually until the steel mills get back into full operation. Then it will zoom.

Details on Page 121

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED OCT. 17	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	125,000*	117,101†	62,716	45,387

*Estimated. †Preliminary.

The new model buildup has been much slower than scheduled because of steel and part shortages. *Ward's Automotive Reports* says automakers will be lucky to attain 50 to 60 per cent of their October goal of 647,000 units.

Details on Page 118

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED OCT. 18	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	368*	362	356	2,003
Index (1947-49=100)	22.9*	22.5	22.2	124.7
Percentage of capacity	13.0*	12.8	22.0	74.2

*Estimated by STEEL; comparative figures reported by AISI.

Upturn in steel production as mills resume operations likely will be slower this time than in previous poststrike periods. The record length of the shutdown indicates that extensive damage has been suffered by some furnaces.

Details on Page 192

STEEL SCRAP PRICE COMPOSITE

	OCT. 14	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$44.33	$43.00	$41.00	$42.33

The strong support given the scrap market by heavy export demand reasserted itself last week. Prices on steelmaking grades moved upward mainly on that factor, to some extent on prospects of heavy buying by domestic mills.

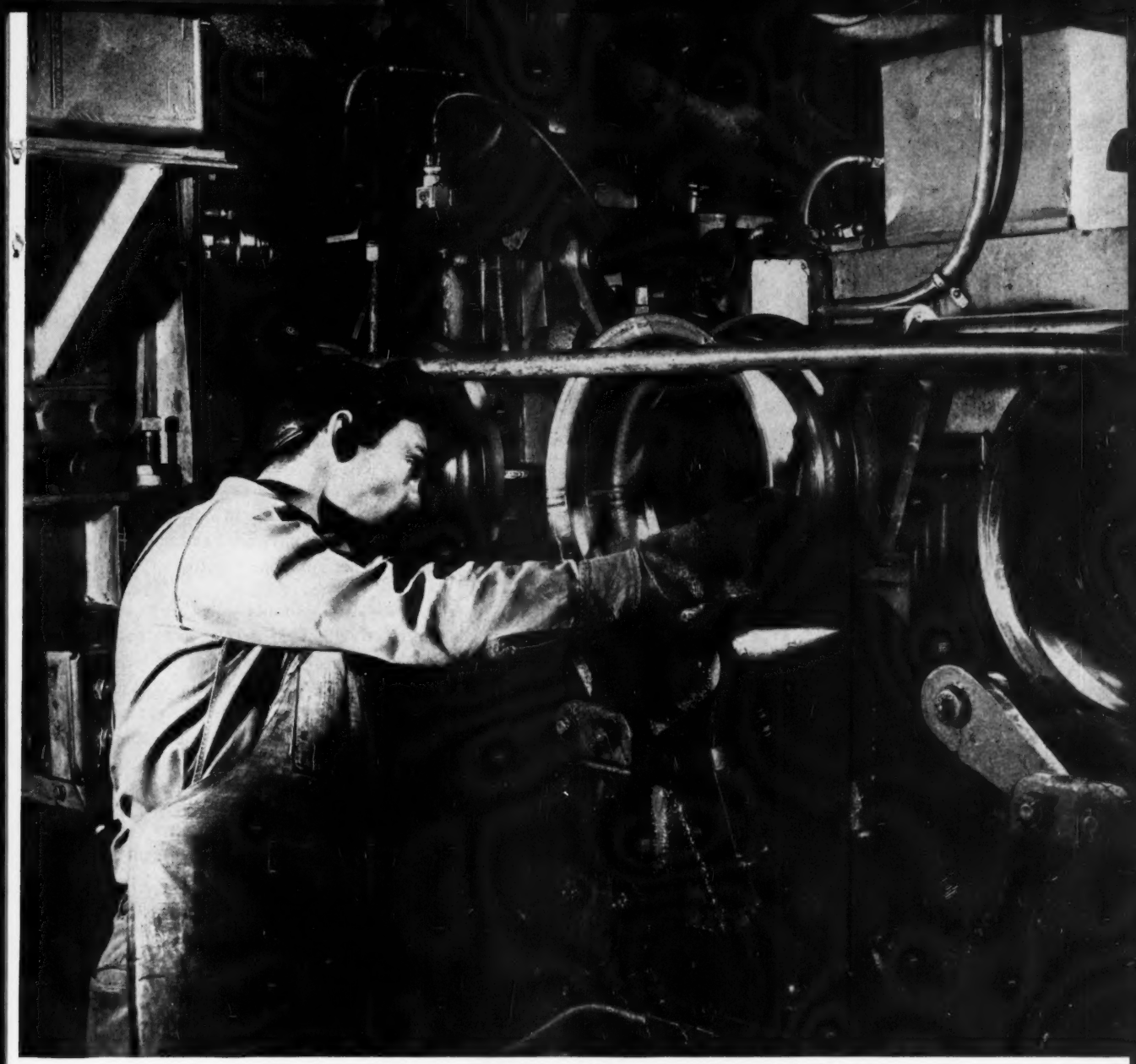
Details on Page 204

FINISHED STEEL PRICE INDEX

	OCT. 13	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.7	186.2

Imminent reopening of mills and subsequent increased supplies of steel products have had no effect on the domestic market pricewise. Those prospects have resulted in some shading of prices on imported metal.

Details on Page 193



A workman checks the contour of a wheel rim before it passes to the next, and final, forming operation. Later, the rims will be welded to the hub and drum assembly to make the complete wheel.

Automobile wheels - a torture test for sheet steel

What a beating the wheels on your automobile must take! And how doggedly they stand up under their gruelling ordeal! Surely this is dramatic proof of the invincibility of strong sheet steel.

But the true torture test of steel sheets takes place in the actual making of the wheels themselves. Take rims for example. Here, the tough, strong sheet must be ductile enough to be spun to the complex contour required. It's no doubt one of the toughest tests imposed on steel sheets anywhere. Only top-quality sheets—like Bethlehem's—will take such severe punishment with uniform success.

Bethlehem sheets have been formed into hundreds of thousands of wheels for leading makes of automobiles. We'll gladly discuss your sheet steel needs, whenever it suits you. Just call our nearest office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor:
Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

CARL S. HARVEY, *Technical Director, Lamson & Sessions, tells why...*

You overspend when you overspecify... on fasteners

Overspecifying can be costly in ordering fasteners . . . especially in view of the trend toward higher "physicals" and correspondingly higher component costs.

Here's a typical example: A customer specified AISI 1137 steel (a screw machine grade) for a nut. After a look at the "physicals" we recommended a cold forged nut of AISI 1030 steel (a straight carbon steel) and met all requirements at considerably lower cost to the customer.

In many instances we're recommending ordinary grades of carbon steel over the customer's specs of low alloy content material. Our improved heat treatment practices make the savings possible. Elementary cases, perhaps, but they happen every day!

Take Advantage of the specialized experience and facilities available to you through L&S. Leave reference to "chemistry" open. Tell us what you want in end results. Give us the "physicals" and tolerances—then stop! This helps us save *you* money, in both purchasing costs and assembly costs.

L & S Fastener Engineering helps you "tighten up" on...

- **PURCHASING COSTS**
- **INSPECTION AND HANDLING COSTS**
- **ASSEMBLY COSTS**

LAMSON & SESSIONS

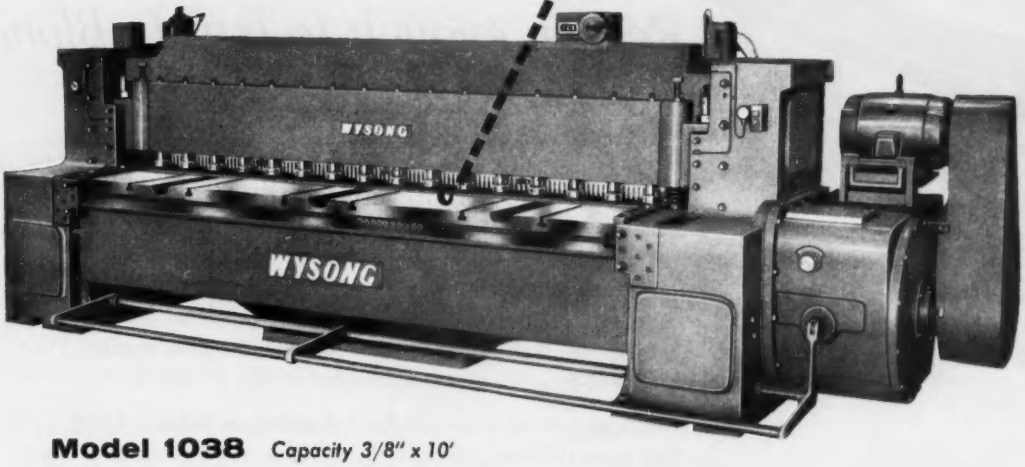
5000 TIEDEMAN ROAD • CLEVELAND 9, OHIO

Plants in Cleveland and Kent, Ohio • Chicago and Birmingham

Want to bet a nickel?

It's a safe bet if your money is on a Wysong. Stand a nickel on its edge on the table of a Wysong shear and another nickel on the table of any competing shear of the same capacity. Start cutting full length on both shears and see how much longer it takes to topple the nickel on the Wysong.

Why? Wysong's compact construction, massive castings and low center of gravity assure less vibration, less deflection and greater rigidity. This is why Wysong shears maintain alignment for unsurpassed accuracy—year after year.



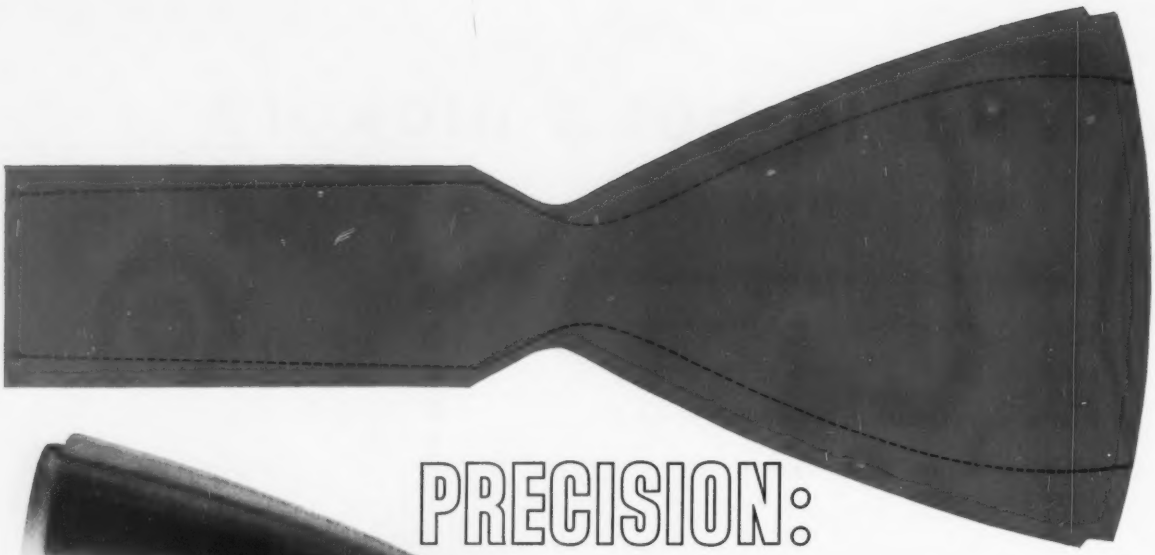
Model 1038 *Capacity 3/8" x 10'*

Other Wysong models have capacities from 16 ga. through 1/2" and cutting lengths from 24" through 12'
You are not gambling when you:

"Buy a WYSONG .... It's MILES ahead"

WYSONG

WYSONG & MILES COMPANY
615 Fulton Street
Greensboro, N. C.

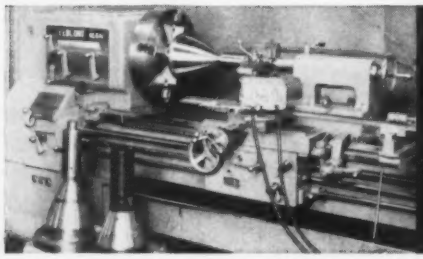


PRECISION:

Reason enough to buy LeBlond

In Hartford, Conn., Delta Corp. chucks a 350 lb. forging of 347 stainless in its tracer-equipped, 24" LeBlond Regal Lathe. Delta is a specialist in precision sheet metal weldments and exacting machining jobs. When this job comes off the Regal it will be a contoured tube weighing only 18 lb. Its walls will vary in thickness from $\frac{1}{8}$" to $\frac{1}{16}$" according to a rigid and complex pattern. Wall thickness will be held to ±.003"; ID to —.001 +.000; OD to ±.008; and finish will be 20 to 30 rms. If the job is run 3 or 30 times, the same precise result will be achieved—reason enough to buy a LeBlond.

You never hesitate to put this kind of work on a LeBlond Lathe. You know that the sturdiness, the horsepower, the precision is there when you need it. It's what you'd expect from the world's largest builder of a complete line of lathes (and of tracers for lathes, too.)



THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND *of Cincinnati*

STEEL
Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio. October 19, 1959

Here's another glimpse of *The Embattled Executive*, the fun poking book published by the American Management Association.

"Clean Desk. A luxury reserved, alas, for top executives of prosperous corporations. All material intended for the eyes of the Chief must sieve through a series of eagle-eyed aides who prune, trim, and condense, until nothing is left but a single paragraph of basic English."

How to Get One

Next week, we'll be offering you a passport to a clean desk. Our Oct. 26 issue will salute the Forty-First National Metal Exposition & Congress, Chicago, Nov. 2-6. Here's the lineup:

Our editors are packing a wealth of information on standard metals and special alloys in a 32 page Metal Selector, the most comprehensive STEEL has ever published. When you get your copy, don't rip out the selector. Additional copies will be available.

When you flip the pages of the Metal Show issue, you'll find the program for the show and articles on "What's Ahead for Superalloys?" and how "Vacuum Melting Upgrades Low Alloy Steels." Our new products section will present equipment that will be introduced at the show.

It's quite a package, one you'll be using for months, perhaps years ahead. Watch for it.

Personal and Otherwise

We welcome a new staffer to STEEL this week, he's Alfred M. Castelnau. Al has taken a number of postgraduate courses in engineering, metallurgy, and sales in the eight years since he was graduated with a B.S. in business administration from New York University. He also accumulated a variety of industrial experience, with emphasis on production engineering. His most recent post was in the advertising department of Crucible Steel Co. of America, Pittsburgh, where he worked with metallurgical and research people on technical assignments.

Al brings an international flavor to our editorial offices. He was born in Pau, France, and by the time he had reached the age of ten, he could boast that he had made four trips between that country and the U. S. While living in Pau, aside from acquiring fluency in French, Al picked up an interest in golf which he still follows.

C'est bon de vous avoir.

Acton Likes Men of Action

W. R. Helms, Dewy Bros. Inc., Goldsboro, N. C., writes: "We read your article on 'The Vanishing Profits' in the Sept. 28 issue. I'd like to obtain eight copies to mail to eight competitors."

Mr. Helms's letter brought a beaming smile to the normally stern visage of Acton Chance, the industrial detective who investigated price fighting's role in the vanishing profits caper. In his raspy private eye manner, Acton commented:

"That's a good letter. If the eight competitors request eight more copies of the article and send them to eight competitors, *ad infinitum*, we'd get the damnedest parlay of chain letters you've ever seen. It could be bigger than the pyramid clubs.

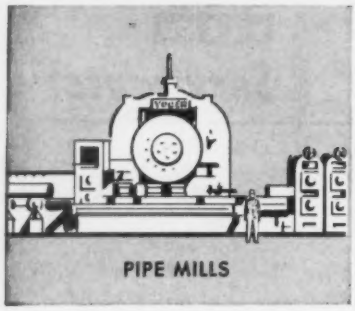
"Besides, I need the publicity. The only good case I've had since the vanishing profits job, has been bourbon."

We told Acton his fears were groundless, pointing out that Miss June Schilens of our Reprint Dept. has filled requests for 25,909 copies of "The Case of the Vanishing Jobs" (STEEL, Apr. 6, p. 99) and 10,595 copies of "The Case of the Vanishing Taxes" (STEEL, May 11, p. 100). When Acton heard about the play given those articles, he jacked up his fee.

Neither Snow nor Rain . . .

. . . nor what have you can slow the distribution of STEEL. That's the motto of Rand Ebersole, distribution manager of the magazine. That's also the reason we handed him the problem posed by William E. Sauter, general manager, C. I. Hayes Inc., Cranston, R. I.

Each week Mr. Sauter receives a flyer, mailed in advance of each issue, which contains our next editorial and Metalworking Outlook. Sometimes the flyer arrives after the magazine has been received, read, and passed on. "What are the



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PIPE AND TUBE MILLS

Today's expanding markets and tightening economy demand closer production cost control. YODER'S complete line of ferrous or non-ferrous Pipe and Tube mills can help you meet production schedules economically... help you realize significant savings in the manufacture of tube and pipe.

YODER Pipe and Tube mills offer flexible production to meet fluctuating demand. They adapt easily to the most rigorous schedules. Everyday manufacture of constant high quality pipe and tube in diameter of 5/16" to 24". Speeds up to 350 fpm plus can be obtained with YODER mills.

YODER also makes a complete line of Slitting equipment and Cold Roll-Forming machinery. Send for your copy of the fully-descriptive book covering Tube Mill operation.

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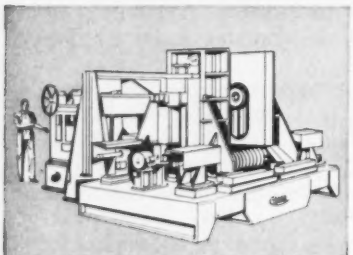
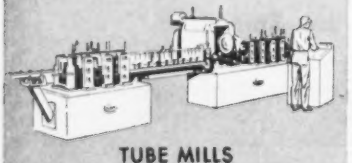




YODER PIPE AND TUBE MILLS (ferrous or non-ferrous)

chances of having the flyer precede the arrival of the magazine?" asks Mr. Sauter.

Chances are excellent, Mr. Sauter. Rand solved the problem.

The mail is often gummed up by routing snags. Sacks of mail can be sidetracked while a mail car is held for a connecting train. It also seems there are pockets in the postal system where mail is notoriously slow. For example, cities 500 miles from Cleveland frequently receive faster mail delivery than those 200 miles away.

It is possible for any single piece of mail to be delayed, says Rand, but when the frequency rate goes up, we'd like you to tell us about it.

They Get the Message

"I have wondered what STEEL has been doing during the steel strike to inform the public . . . beyond what you are doing through the publication itself," writes Alfred K. Walter, Beaumont, Heller & Sperling Inc., Reading, Pa. "Have your people been doing such things as making speeches and getting interviewed on television?"

That they have, Mr. Walter, but finding out how many people were reached is kind of like counting the population of China.

At least five of our editors, Walt Campbell, Irwin Such, John Morgan, Vance Bell, and Erle Ross, have made radio and TV commentaries on the strike. We couldn't begin to estimate the number of times STEEL was quoted on newscasts.

During the first ten weeks of the strike, Assistant Editor Eileen Cortes, the lady who issues our news releases, tabulated an average of 193 publications quoting STEEL each week.

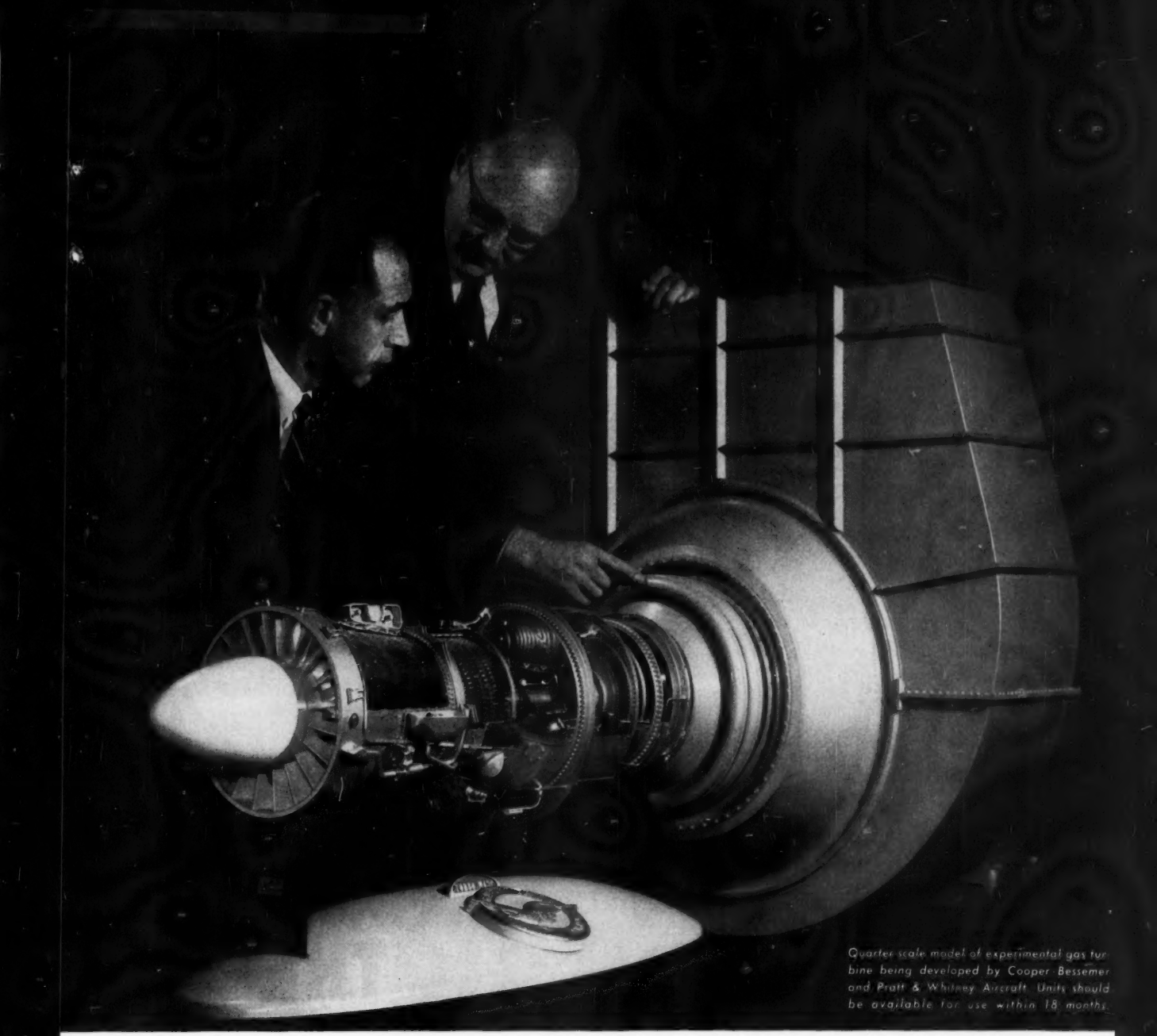
Let's narrow the field, Mr. Walter. The three daily newspapers in Cleveland have a combined daily circulation of around 756,000. Those papers quoted STEEL about once a week during the first 15 weeks of the strike—that equals exposures in excess of 11 million. If we say each paper is read by an average of three persons, we're talking about 33 million exposures.

Now, if we go back to late in 1958, when STEEL began predicting a long and bitter strike . . . but that's too much. Let's say that during the strike, we estimate exposures have run into billions.

We Printed a Clinker

Aeroprojects Inc., West Chester, Pa., calls our attention to an error in STEEL's Aug. 31 article, "Ultrasonics Gain Speed in Joining Thin Aluminum."

In the photo caption, mention was made of seamweld speeds over 30 ipm. In the article, speeds above 30 fpm were cited. The 30 fpm figure should have appeared in both places. As a matter of fact, the company says it has substantially exceeded the 30 fpm speed in welding 0.010 in. aluminum sheet.



Quarter scale model of experimental gas turbine being developed by Cooper-Bessemer and Pratt & Whitney Aircraft. Units should be available for use within 18 months.

How Cooper-Bessemer is teaming up with Pratt & Whitney Aircraft to develop JET TURBINE POWER for industry

The cutaway model shown is a revolutionary new concept in gas turbines. The generating unit is a new Pratt & Whitney Aircraft jet engine—a modification of the famous J-57 aircraft engine, designed for gas fuel. The companion power unit is a new Cooper-Bessemer power turbine. This combination, now in the advanced experimental stages, represents the hottest development in industrial power in 20 years. It will mean drastic economies in installations of engine-driven compressors, generators and other rotating machinery.

For example, in gas compressor stations, it is expected to reduce total station cost by 50%!

Plans call for this new gas turbine to be available for broad application within 18 months. In the meantime, watch for reports on further developments in this pioneering teamwork by Cooper-Bessemer and Pratt & Whitney Aircraft.

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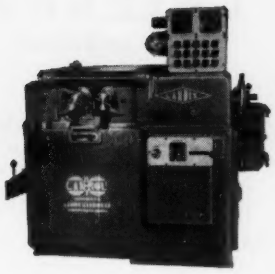
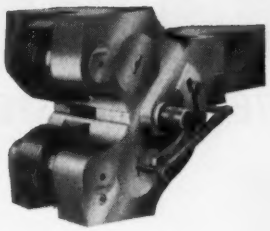
3
LANDIS HAS ALL THREE



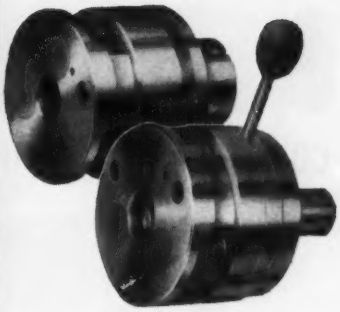
THREAD ROLLING MACHINES

. . . produce strong, accurate threads of excellent finish by the chipless, cold-forming process . . . produce left- and right-hand threads of all types (except square), including UNC, UNF, Acme, worm, and many special forms.



THREAD ROLLING ATTACHMENTS

. . . produce either straight or tapered threads . . . exclusive features include: tipping to avoid indexing interference . . . simple design allows disengaging attachment without disturbing set-up . . . and a gage determines precise position where vertical centerlines of both rolls and workpiece coincide.



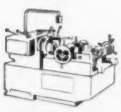
THREAD ROLLING HEADS

. . . produce Class 4 threads of excellent finish at high speeds . . . feature replaceable helix angle bushings which allows rolling threads with exact helix angles without purchasing major head components.

Whatever your Thread Rolling requirement, there is a LANDIS machine or tool to do the job. Our detailed knowledge of the most efficient application of the different methods of thread rolling—and our more than 50 years experience in the threading field—has resulted in our producing a complete line of thread rolling equipment. Make LANDIS your one-stop source for all your thread rolling needs. When inquiring about Thread Rolling, describe your operation and send specifications.

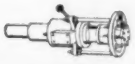
LANDIS *Machine* COMPANY / WAYNESBORO PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

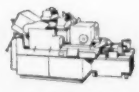


Threading Machines

Die Heads—Rotary & Stationary

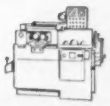


Taps—Collapsible & Solid Adjustable



Centerless Thread Grinding Machines

Thread Rolling Tools

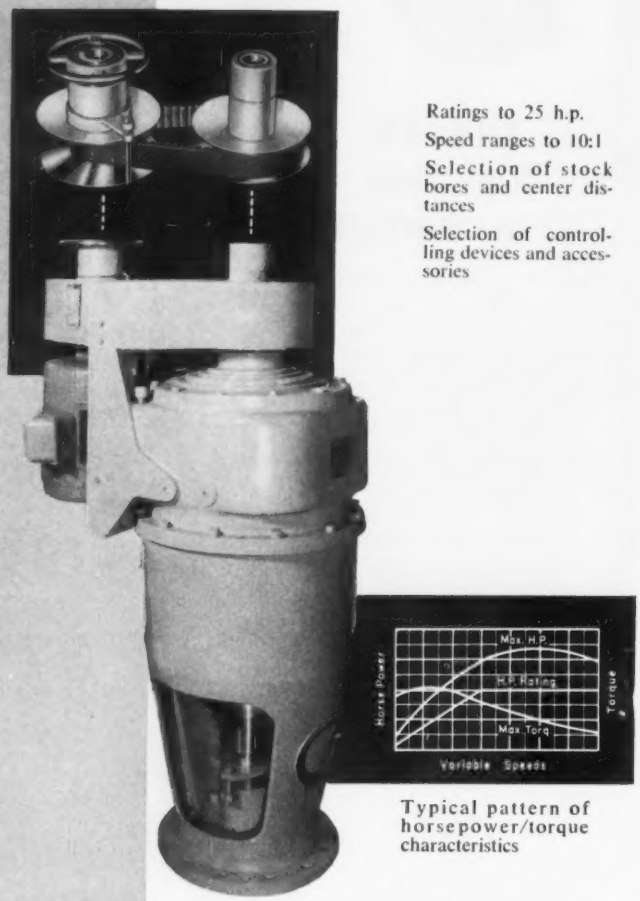


Thread Rolling Machines

550C

LEWELLEN

COMPONENTS INCORPORATE VARIABLE SPEEDS



Typical pattern of horsepower/torque characteristics

Ratings to 25 h.p.

Speed ranges to 10:1

Selection of stock bores and center distances

Selection of controlling devices and accessories

The shaft of a standard motor and the equipment input shaft mount the drive.

With an 1800 r.p.m. motor, any input speed from 500 to 4000 r.p.m. is available.

Handwheel adjusts speeds while running, without altering shaft center distance.

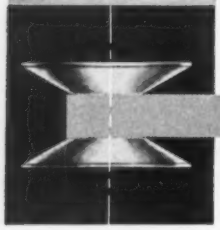
Shaft and bearing loads are normal. No thrust loads are imposed. No beefing or supporting structure is required.

Installation is quickly and easily made. Normal service requires only routine lubrication.

Sustained performance with overload capacity is obtained.

Lewellen Combination Pulleys offer a direct, compact, economical method for applying variable speeds.

Catalog 70 defines and dimensions the performance, convenience and utility of Lewellen Pulleys.



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Manufacturing Company, Columbus, Indiana

Distributors in All Industrial Areas. In Canada—Peerless Engineering Sales, Ltd., Toronto-Montreal

CALENDAR OF MEETINGS

Oct. 19-20, Magnesium Association: Annual meeting and exhibit, Roosevelt Hotel, New York. Association's address: 122 E. 42nd St., New York 17, N. Y. Executive secretary: Jerry Singleton.

Oct. 19-21, American Society of Lubrication Engineers and American Society of Mechanical Engineers: Joint lubrication conference, Sheraton-McAlpin Hotel, New York. Information: ASLE, 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: Calvert L. Willey.

Oct. 19-23, American Society of Civil Engineers: Annual convention, Hotel Statler-Hilton, Washington. Society's address: 33 W. 39th St., New York 18, N. Y. Executive secretary: William H. Wisely.

Oct. 20-22, American Standards Association: National conference on standards, Sheraton-Cadillac Hotel, Detroit. Association's address: 70 E. 45th St, New York 17, N. Y. Managing director: G. F. Hussey Jr.

Oct. 21-23, Society for Experimental Stress Analysis: Annual meeting, Pick Ft. Shelby Hotel, Detroit. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

Oct. 21-24, National Management Association: Annual meeting, Statler-Hilton Hotel, Detroit. Association's address: 333 W. First St., Dayton 2, Ohio. Executive vice president: Marion Kershner.

Oct. 22-23, Galvanizers Committee, American Zinc Institute Inc.: Fall meeting, St. Francis Hotel, Canton, Ohio. Institute's address: 60 E. 42nd St., New York 17, N. Y. Secretary-treasurer: J. L. Kimberley.

Oct. 22-24: Non-Ferrous Founders' Society: Annual meeting, Bedford Springs Hotel, Bedford, Pa. Society's address: 1604 Chicago Ave, Evanston, Ill. Executive secretary: Herbert F. Scobie.

Oct. 25-27, American Machine Tool Distributors Association: Annual meeting, Statler-Hilton Hotel, St. Louis. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Oct. 25-28, National Lubricating Grease Institute: Annual meeting, Roosevelt Hotel, New Orleans. Institute's address: 4638 J. C. Nichols Parkway, Kansas City 12, Mo. General manager: T. W. H. Miller.

Oct. 26-28, American Gear Manufacturers Association: Semiannual meeting, Edgewater Beach Hotel, Chicago. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive director: John C. Sears.

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Wherever they are, users of Towmotor-Gerlinger fork lift trucks and carriers know that the industry's fastest service is as handy as a phone call. It's one of the reasons why industrial firms have invested millions of dollars in Towmotor-Gerlinger equipment.

Over 90% of parts are replaced off the shelf at local service centers —others within 24 hours! Prompt repairs are made by service experts. Even engine overhauls are treated like emergencies to maintain Towmotor's reputation for *Continuous Operation.* This is aided also by Towmotor Preventive Maintenance Service *which actually averts downtime, prevents wear, cuts repair bills and keeps equipment on the job around the calendar!*

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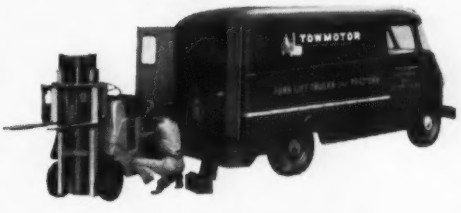
Find Your Nearest Distributor In The 'Yellow Pages'



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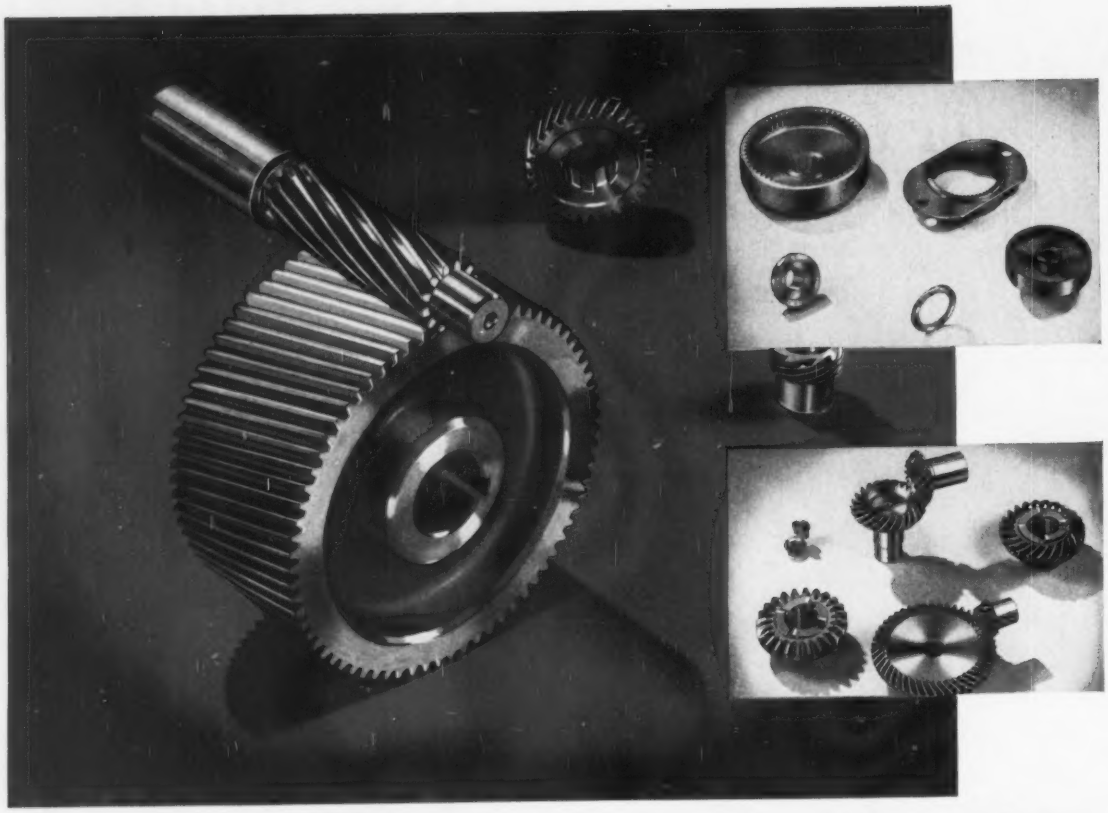
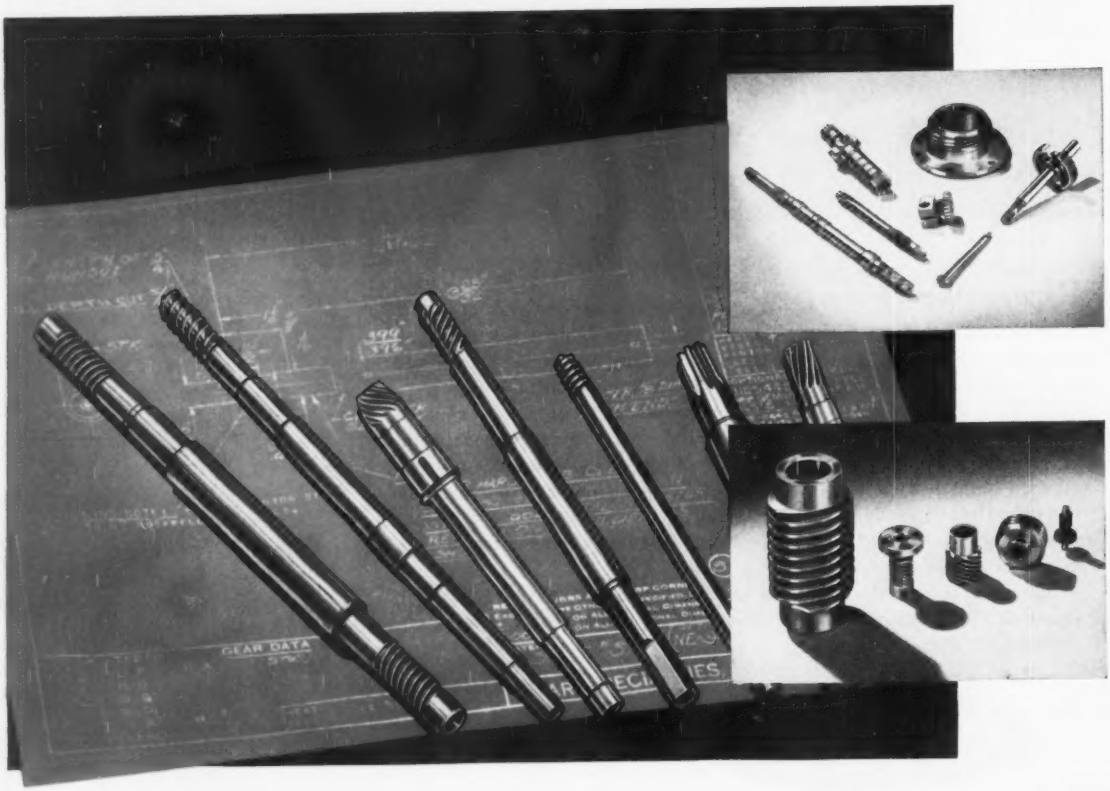


All types of Small Gearing—made with custom



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G.S. takes great pride in the long, long list of customers who have relied on our ability and our performance for many years to supply all or the major part of their Small and Intermediate Gearing requirements. The most famous leaders in a dozen major industries are old friends —along with hundreds of smaller but mighty important producers of quality units.

A supplier has to do more than just "make gears" to develop and maintain such a business. For one thing, he must develop a staff of outstanding experts in all the phases of design and manufacture of his specialty; for another, he must maintain a sincere interest in the solution of the problems of his customers, large or small—not just a yen for another order; and third, he must be able to consistently deliver custom quality under the most demanding conditions—*at full-run production prices.*

Now well into our fifth decade of specialization, G.S. is *the world's largest exclusive manufacturer of fractional horsepower gearing*—with the most modern, most complete, most efficient manufacturing equipment and production techniques you can find, to implement our mounting years of practical experience.

We invite your inquiry about what G.S. might do for you—in terms of potential savings, improved product performance and useful life, fewer costly interruptions to your production lines because of over-variance from specifications. Our engineers are at your service to discuss development of new projects, or better means of accomplishing old ones. Call or write us today.

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Adding Machines • Aircraft Carburetors & Fuel Metering Systems • Aircraft Instruments and Radios • Automatic Musical Instruments • Automation Systems • Business Machines • Check Signing & Protecting Machines • Clippers for Barbers, Animal Shearing & Hedge Trimming • Cloth Cutting Machines • Coin Changers & Counters • Communication Equipment • Control Mechanisms • Electric Fans • Electric Motors • Floor Polishers, Sanders, Scrubbers, Sweepers • Food & Drink Mixers, Blenders • Home Appliances • Lawn Sprinklers • Machine Tools • Meat Tenderizers, Grinders, Slicers • Military Equipment • Motion Picture Cameras & Projectors • Optical Instruments • Outboard Motors • Pneumatic Production Tools • Radio & Radar Tuning Assemblies • Radio Anti-backlash Gears • Range Finders • Record Changers • Sewing Machines • Steel Strap Stretchers • Step Switches • Tapping, Drilling & Threading Equipment • Telephone Dials • Television Sets • Thermostatic Controls • Typewriters • Vending Machines • Washing Machines.

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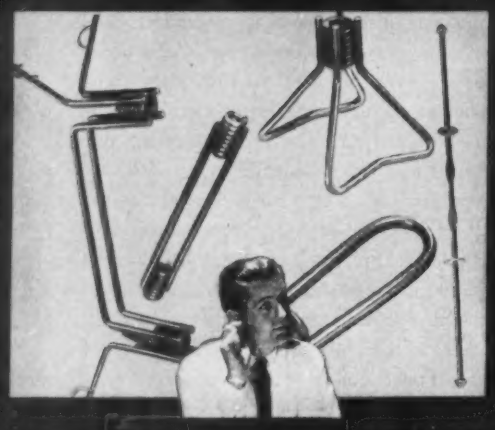

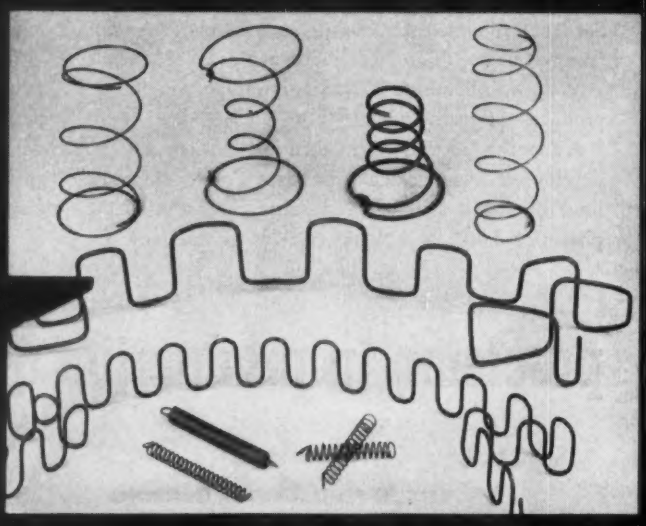

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Imagine wire of consistently uniform quality that assures accurate, easy forming with adequate strength and toughness to meet the most difficult design and forming problems.

That's Republic Steel Wire—strong, ductile, tough—available in many types and in a wide range of gages and physicals for almost any product you can imagine.

The variety of products illustrated above are examples of "imagenuity in wire"—engineering imagination plus modern business ingenuity. Fabricators of these products use:

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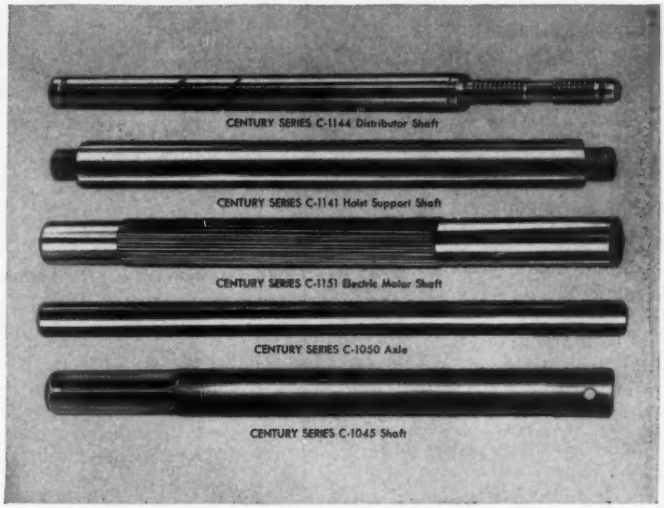
2. Republic Spring Wire for outstanding performance in automotive seat and back cushions, furniture, bedding, and mechanical spring applications. Standard High Carbon Spring Wire and MB High Carbon Wire are produced by experts who know and understand both steelmaking and high carbon wire drawing practices. They know spring forming machines and the importance of physicals, finish, cast and size accuracy in the end product.

3. Republic Screw, Rivet, and Heading Wires to meet the most exacting demands of modern upsetting, roll threading, and extrusion machines. Republic Wire is specially produced to assure internal soundness and freedom from injurious surface defects. It flows freely. Fills out dies in difficult upsetting operations.

Republic Wire Metallurgists are ready to assist you in selection, application, and processing. They investigate the desired end use—your problems of quality, yet low-cost, quantity production—then suggest a specification to do the job. The coupon is your invitation to use this obligation-free service. Mail it today.

IMAGENUITY IN PIG IRON resulted in the development of ductile iron diesel engine pistons with nearly double the service life of aluminum pistons. Using Republic Chateaugay Pig Iron as the base metal, Hunt-Spiller Manufacturing Corporation successfully designed and produced a diesel engine piston with high mechanical strength, minimum weight, maximum wear- and heat-resistance, low ultimate cost. Chateaugay's high total carbon and unusually low phosphorous, silicon, and manganese content suit it perfectly for ductile iron use. Inherently excellent physical properties are maintained in the ductile form assuring strong, flaw-free castings accurate to patterns and shapes. Send coupon for full facts.

IMAGENUITY IN ALLOY STEEL enabled Convair engineers to increase strength of major structural components in the 880—world's fastest jet airliner. In each 880 pod-pylon, rear engine mount of alloy steel grips and supports the powerful jet engine. Republic Alloy Steels offer exceptionally high strength/weight ratios with the highest strength values. Uniform response to heat treatment assures complete deep hardening penetration, plus hard, wear-resistant surfaces. Send coupon for more facts.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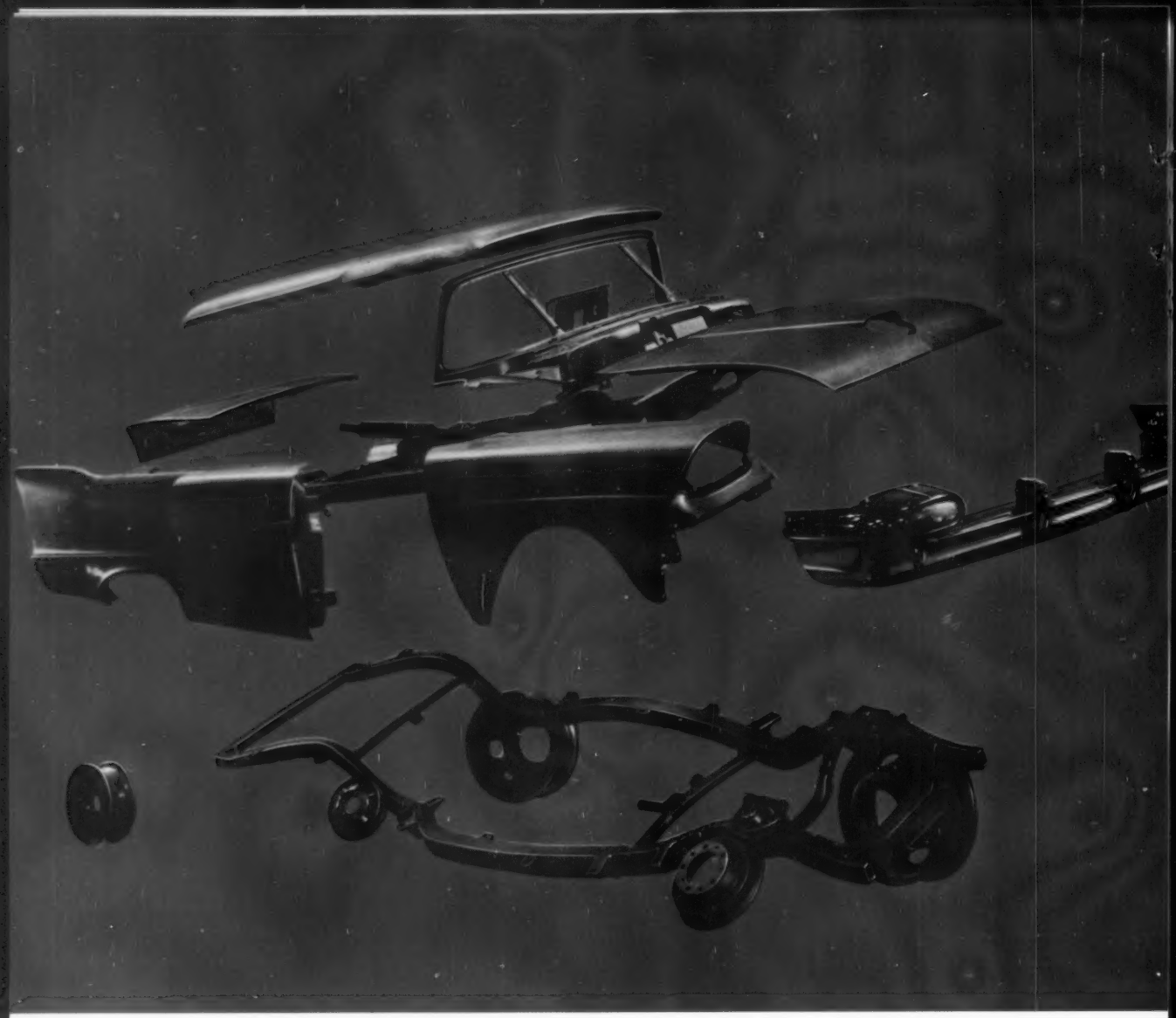
. . . a tribute to versatile steel

More cars travel American highways than those of the rest of the world combined.

Hearts, sinews, and backbones of these cars and trucks were made from some 130,000,000 tons of rugged steel—a substantial chunk of it furnished by Bethlehem. Steel, and steel alone, combines the strength, the ductility and the versatility necessary in so many automotive products.

BETHLEHEM STEEL



Steel

is strong, ductile, versatile

BETHLEHEM STEEL

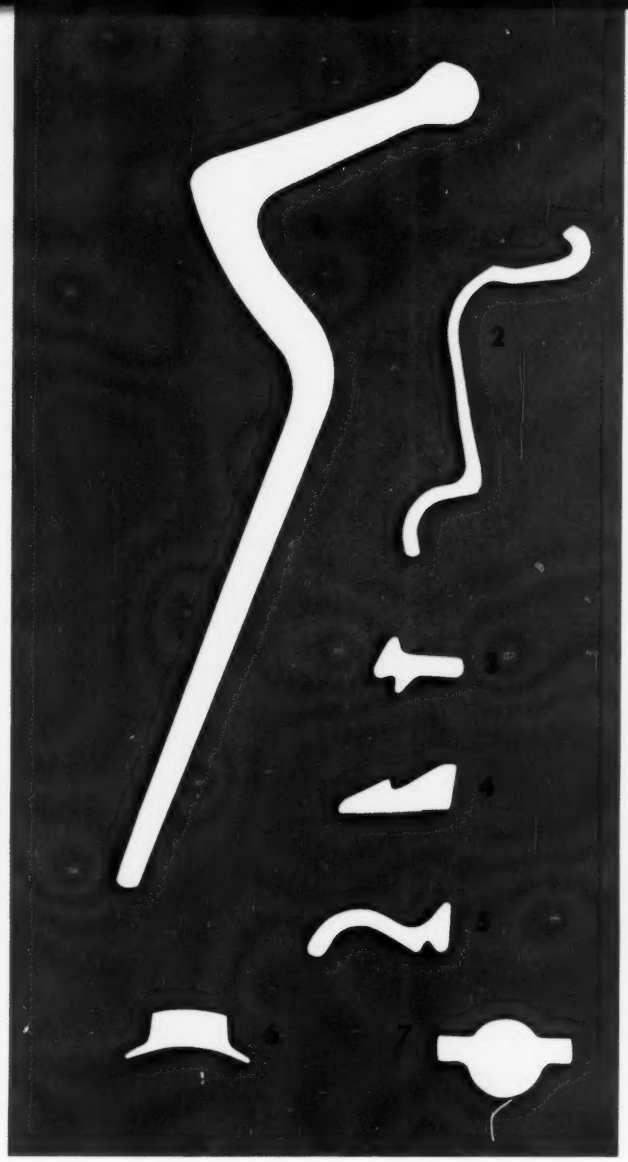
Sheet steel literally flows to make fenders, frames, panels

Rigid and tough as sheet steel is, it is amazingly plastic. Between the dies of a press, it literally flows. Fenders, bumpers, decks, frames conform precisely to the designer's dream. One giant punch, and a one-piece roof panel emerges.

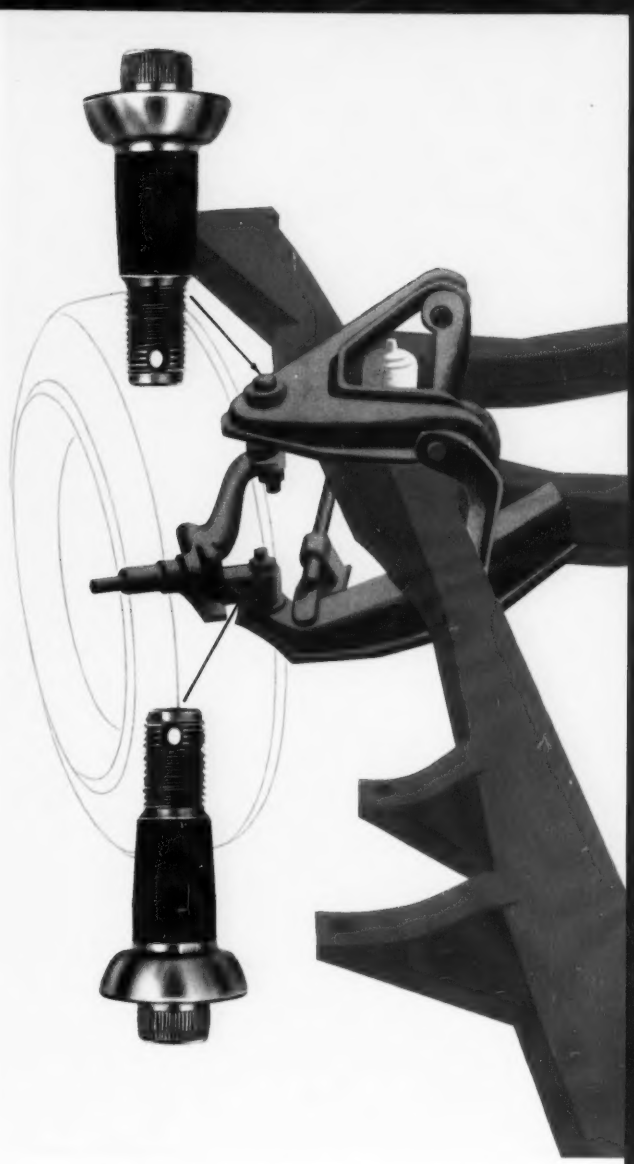
Thousands of tons of Bethlehem hot-rolled and cold-rolled sheets go into parts, components and subassemblies of American automobiles. Only top-quality sheet steel turns in consistently good performances in such demanding applications.

If you work with sheets—whether in deep drawing or simple bending—you can count on Bethlehem sheets to meet your most exacting requirements.

BETHLEHEM ENGINEERS WILL HELP YOU WITH YOUR



Hot-rolled from Bethlehem carbon bars for specific automotive use, these sections are: 1) gooseneck hinge; 2) tire rim; 3) tire lock ring; 4) door latch; 5) tire side ring; 6) pole piece; 7) trunnion bearing.



Theoretical example shows how ball stud, cold-headed from Bethlehem wire, fits into a typical ball-joint suspension system. Bethlehem sheets are widely used to form frame members and other vital parts.

Bethlehem steel bars hot-rolled to your section

Above are just a few of the special sections which we hot-roll to dimensions for automotive parts. Bethlehem can roll an almost unlimited variety of special sections for a wide range of finished parts.

When you use special sections, you're putting strength right where you need it. And you get rid of excess metal and scrap loss. Net result: substantial savings for your operation, and often a better product. Bethlehem engineers will be glad to discuss special bar sections with you.

This ball-joint stud cold-formed from Bethlehem wire

Here is a ball-joint suspension part, cold-formed from Bethlehem alloy cold-heading wire. Although some finish-machining is required to meet the hair-line tolerances, the cold-heading, knurling and threading virtually eliminate scrap loss and speed up production. And, of course, cold-working produces a stronger finished part.

Even more complex parts than this can often be cold-headed with spectacular savings. Heading-quality wire, custom-made for the job, has long been a Bethlehem specialty. Let one of our engineers help you investigate the possibilities of cold-heading wire for your products.

BETHLEHEM STEEL

STEEL-WORKING PROBLEMS

Would one of these Bethlehem publications help you?

Booklet 415-C, "Quick Facts about Alloy Steels"

Catalog 436, "Bethlehem Industrial Fasteners"

Booklet 366, "Guide for the Selection of Carbon Steel Bars"

Folder 615, "Bethanized Wire"

Catalog 466, "Bethlehem Steel Plates"

Handbook 393-B, "Tubular Products"

Descr. Sheet 208, "Air-4 – Our New Free-Machining Tool Steel"

Catalog 464, "Bethlehem Crane Rails"

Steel

is strong, ductile, versatile... AND BETHLEHEM MAKES IT IN NEARLY EVERY FORM

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded carbon and alloy steels
Special rolled sections

TOOL STEELS:
A grade for every job

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged special sections

SHEETS:
Hot- and cold-rolled
Continuously galvanized

TIN MILL PRODUCTS:
Electrolytic and hot-dip tin plate; black plate

PLATES:
Universal and sheared

WIRE ROPE AND SLINGS

FASTENERS:
Standard bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
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Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

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WELDMENTS:
Frames, tanks, housings, vessels

RAILS:
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CASTINGS:
Carbon, alloy and stainless steel
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M 8

Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

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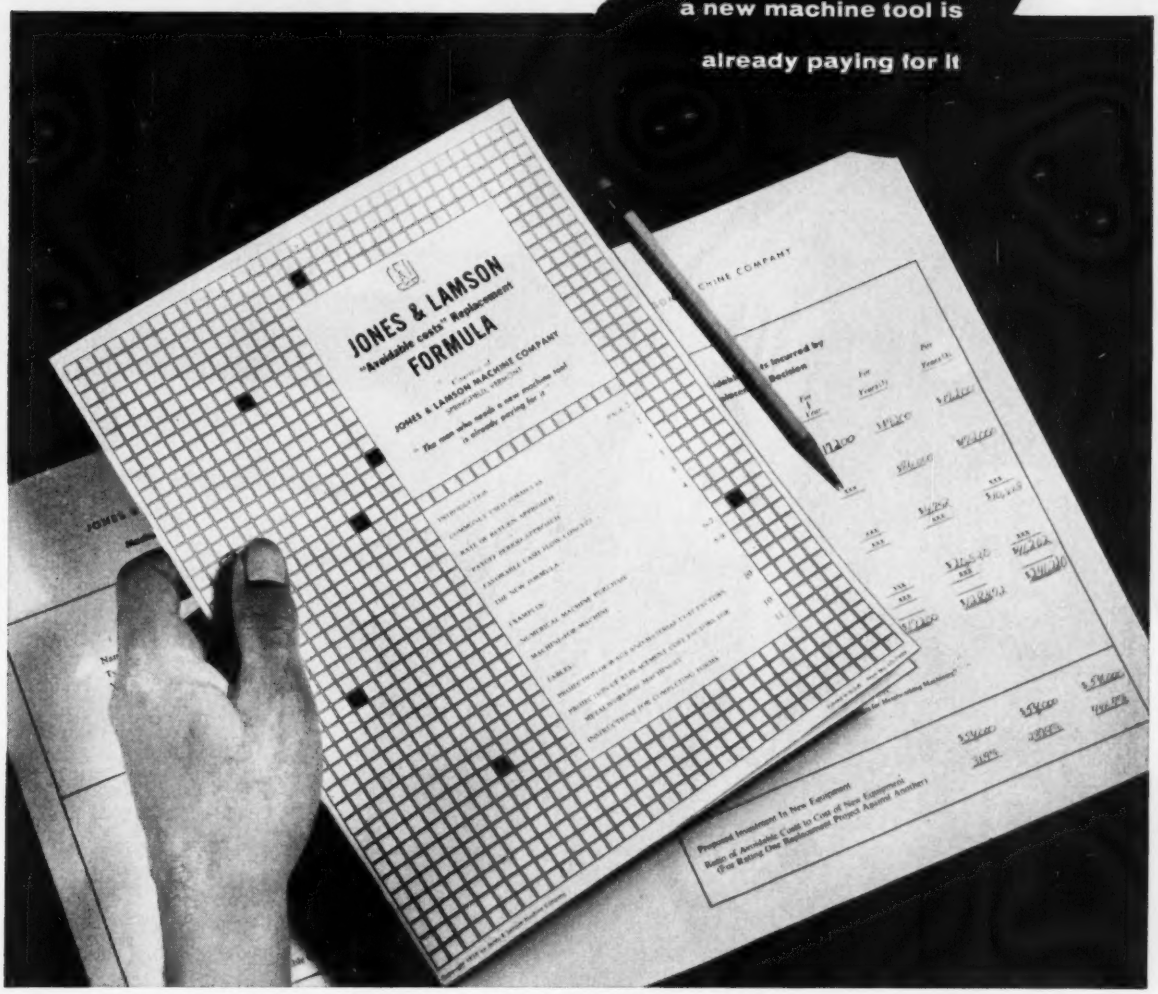
BETHLEHEM STEEL

BETHLEHEM STEEL

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it



How to get Equipment Dollars from Management

To management men, nothing speaks so eloquently as facts. Take the men in *your* front office, for instance. When told that a new machine tool (or several new ones) is a "must", they may very well be inclined to agree. But they have to be *shown*.

In order to sell management, you must present an accurate, factual statement, comparing current productivity of existing equipment, with the productivity attainable with new, advanced equipment.

And this is where you must exercise extreme caution.

Why?

Because, practically without exception, the formulas commonly used for evaluating machine tool performance contain flaws, fallacies and limitations which are seriously misleading. They give an erroneous picture because they distort the facts.

Happily, J & L has the answer to this problem. It's the new J & L "Avoidable Costs" Replacement Formula, which gives you an easy, step-by-step method of productivity evaluation which is logical, accurate and reliable. This formula is tried and true. It gives you a clear, true picture and supplies you with the facts you need in order to get that new machine you're looking for.

For your copy of J & L's "Avoidable Costs" Replacement Formula, together with easy-to-use work sheets, write Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

Pride in his work!

Here's a man who really has it. His educated touch, on the controls of this 4-high rolling mill, holds Bristol Brass sheet and strip to precisely the specified thickness, *down to tenths of thousandths of an inch.* This working combination of mill-wise men and modern machinery is what makes every foot of Bristol sheet and strip "Brass at its Best."

The **BRISTOL BRASS**
CORPORATION

Since 1850, makers of Brass strip, rod and wire in Bristol, Connecticut
Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse

AND FOR BRASS FORGINGS, TOO . . . ACCURATE BRASS CORP. (SUBSIDIARY OF THE BRISTOL BRASS CORP.), BRISTOL, CONNECTICUT.

POSITIVE DUPLICATION – EVERY TIME!

Exact duplication of one person's fingerprints by another person is impossible. Discovery of this amazing fact in 1891 changed the science of detection and identification throughout the world.

CUT CLEANING COSTS

You'll be able to track down and arrest cleaning room costs . . . when you start using CINCINNATI (PD) WHEELS. That's because all (PD) ° wheels (including the swing frame wheels shown above) are made by the remarkable CINCINNATI (PD) manufacturing process. Plus the fact that our trained and experienced grinding specialists are ready to assist you in quickly detecting the best grading for snagging operations.

KEEP COSTS CUT

When you have the CINCINNATI (PD) WHEEL that gives you the lowest labor and wheel cost, you then can be sure that every reorder wheel will act and grind exactly like the original wheel. The CINCINNATI (PD) manufacturing process gives you Positive Duplication . . . time after time after time. Once your cleaning costs are cut, they *stay* cut . . . with CINCINNATI WHEELS.

CALL CINCINNATI

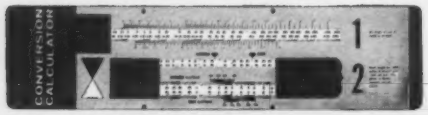
For the help of a CINCINNATI grinding specialist in working down those cleaning room costs, call your CINCINNATI (PD) GRINDING WHEELS distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI°
GRINDING WHEELS

°Trade Mark Reg. U. S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



NEW! ANOTHER BIG BONUS IN ALCOA SCREW MACHINE STOCK

With the exclusive new Alcoa Conversion Calculator, it's a snap to find total costs and resulting per cent savings in switching to aluminum screw machine stock . . . in just three minutes or less. This handy slide-rule calculator does all the mathematical computations! Just set the part length at the stock size and read out the pounds of brass and aluminum per 1,000 pieces . . . with *automatic allowance* for 5 per cent operating scrap, 3 per cent bar end loss and 0.103-in. cutoff and facing loss. Then, determine your local material costs and—zip!—you've got the gross rod or bar costs for both metals. The reverse side of the calculator gives you an equally fast answer for the percentage savings when you switch to Alcoa® Aluminum.

Call your Alcoa sales office or Alcoa distributor today for an Alcoa Conversion Calculator. You'll find them listed in the Yellow Pages of your telephone directory under "Aluminum."

Your Guide to the Best in Aluminum Value

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and the Emmy Award winning "Alcoa Theatre" alternate Mondays, NBC-TV

ALCOA ALUMINUM

And don't forget those many additional bonuses when you deal with Alcoa:

- Alcoa Aluminum Screw Machine Stock allows up to four times higher cutting speeds than other materials—up to 1,000 sfpm speeds.
- Wider range of sizes in standard stock for important price advantages.
- Stock in specific 12-ft lengths at no extra cost . . . in rounds to 2⅞ in. and hexagons to 2 in. across flats.
- Chamfered ends at no extra cost in a wide range of sizes and alloys.
- A guaranteed market for up to 60 per cent of your turnings and borings from four aluminum alloys.
- An extensive mill inventory to back up the nationwide distributor stocks and cover emergency requirements of mill customers.

Alcoa Aluminum Screw Machine Stock Alloys:

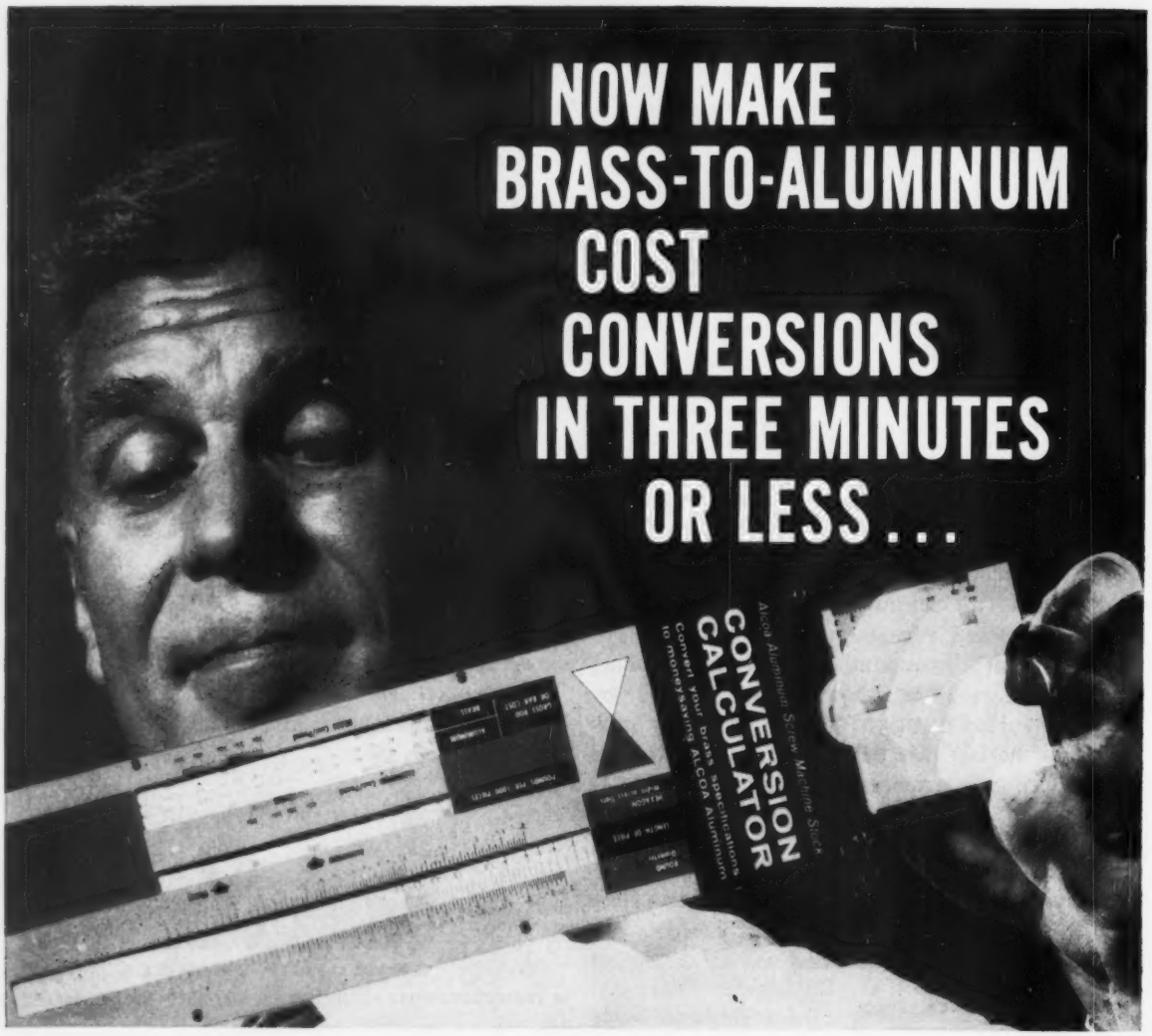
2011-T3: Tops in machinability. Frequently exceeds turning speeds of free-machining brass.

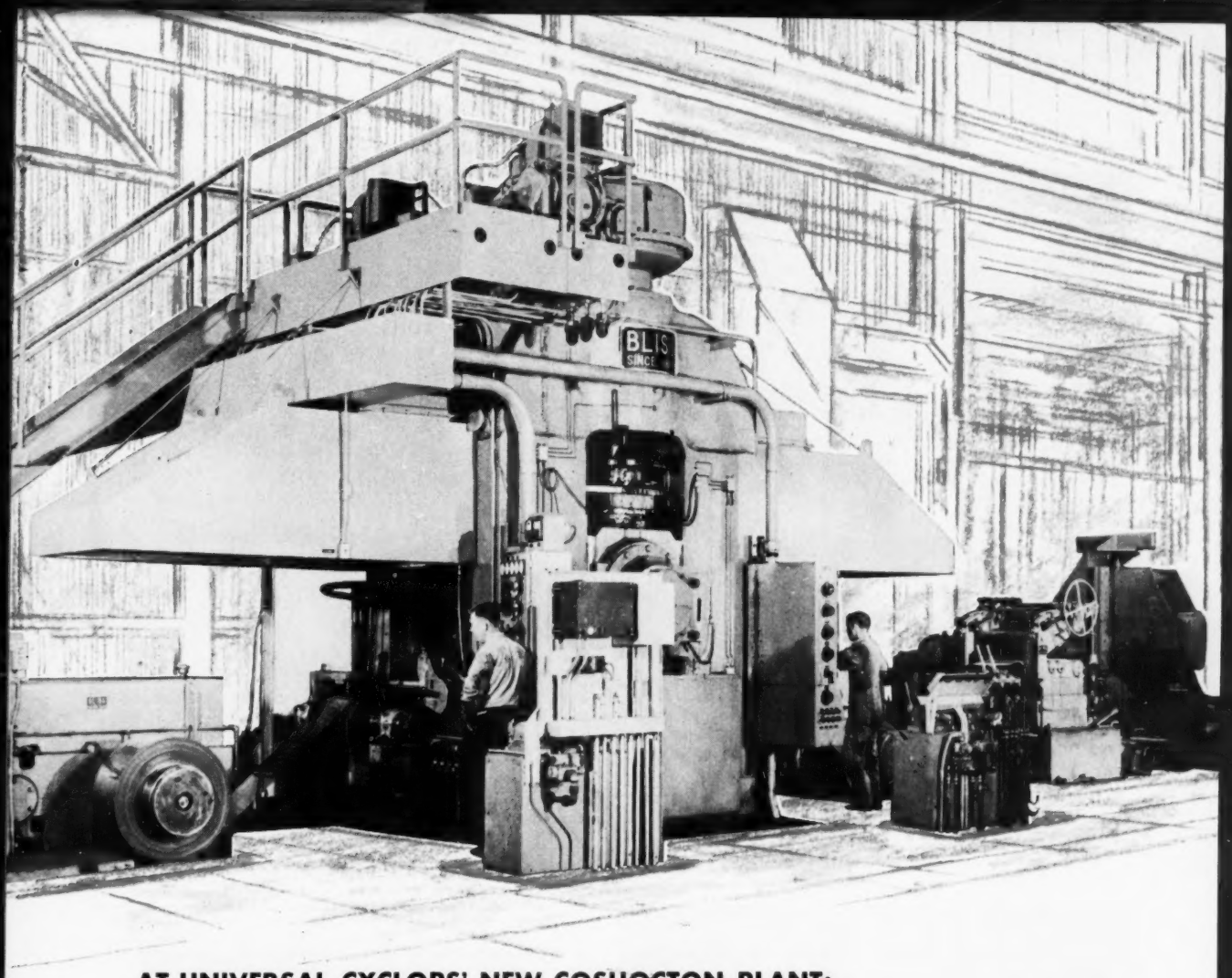
2011-T8: Designed for deep drilling operations. Maintains close tolerances.

2017-T4: One of the strongest alloys used for machine work. Chips readily controlled.

2024-T4: Exceptionally high strength. Cuts at high speeds and feeds for higher production rates.

6061-T6: Excellent finishes possible. Resists corrosion.





AT UNIVERSAL-CYCLOPS' NEW COSHOCTON PLANT:

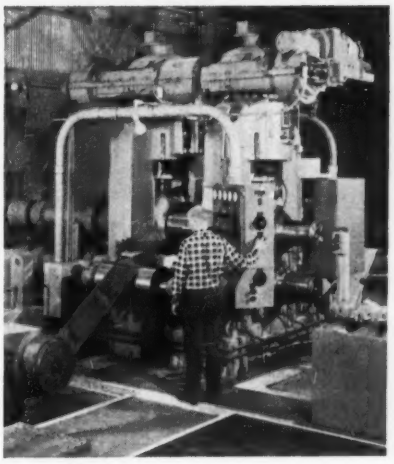
Stainless gets a fine finish fast

All the rolling at Universal-Cyclops Steel Corporation's new stainless strip finishing plant at Coshocton, Ohio, is accomplished on two rolling mills designed and built by Bliss' Rolling Mill Division. Steels rolled include all standard AISI grades in widths up to 24 inches.

Workhorse of the two mills is the 4-high reversing mill shown above. It is ruggedly built to stand heavy rolling stresses developed at speeds as high as 1000 fpm. Auxiliary equipment includes a three-stop coil entry ramp, coil buggy and mandrel-type payoff reel, flattener and feed roll, tension reels and coil buggies.

The two-high Bliss temper mill (right) is used principally for straight chromium grades of stainless providing proper hardness and a lustrous finish to the strip. An unusual design feature is the absence of an entry guide box, eliminating a source of dirt accumulation and strip scratching.

These two mills at Universal-Cyclops are typical of the modern approach to rolling mill design you'll find at Bliss. For other examples of our work, write us today for your complimentary copy of the 84-page Bliss Rolling Mill Brochure, Bulletin 40-B.

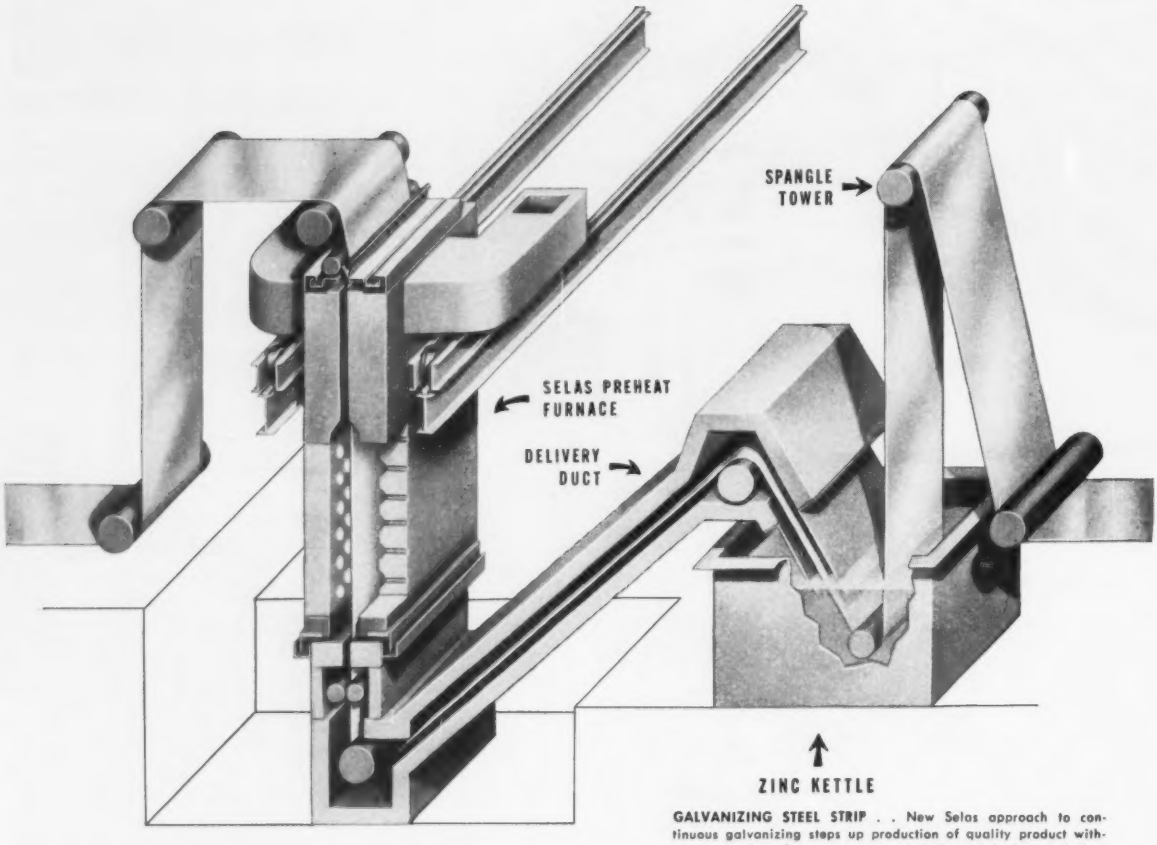


BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



GALVANIZING STEEL STRIP . . New Selas approach to continuous galvanizing steps up production of quality product without increasing floor space occupied by original installation. Compact Selas vertical furnace quickly preheats strip to galvanizing temperature . . eliminates need for fluxing . . fits into line, replacing fluxing equipment. External firing of zinc kettle is minimized because evenly heated strip imparts heat to zinc bath . . achieving (1) longer kettle life, (2) less zinc consumption, (3) reduced dross formation and (4) uniform coating. Unusual safety feature provides fast, automatic withdrawal of furnace from strip in case of line stoppage.

SELAS GRADIATION®: Precise Heat Processing for the Steel Industry

Throughout the steel industry—in mills and metalworking plants—Selas Gradiation heat processing is successfully used in many operations. The versatility and adaptability of the Gradiation principle are demonstrated by the diversity of applications shown in the installation photographs on facing page.

Gradiation is a concept and technique of heat processing which coordinates fast, controlled heating with the nature of the workpiece . . considering its composition, size, shape, heat transfer characteristics and physical properties . . to develop desired product quality, in minimum time, with maximum efficiency, and with the use of automatic and compact equipment.

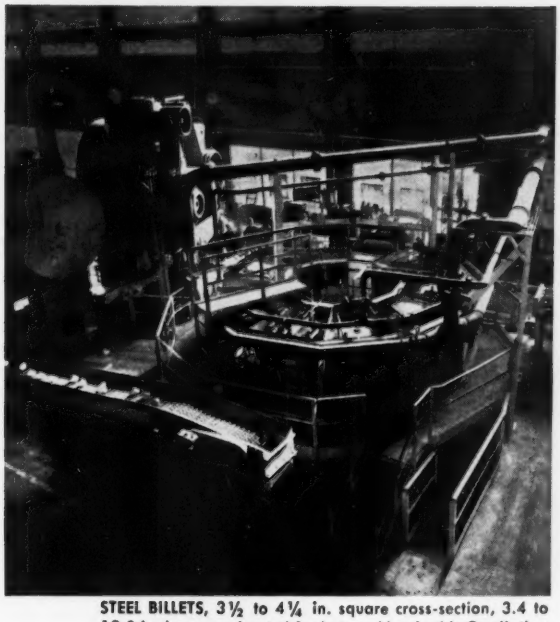
Designed and custom-built to meet your specific heat processing needs . . for hot working . . galvanizing . . tinning . . heat treating heavy sections and special shapes . . Gradiation equipment contributes production economy, high production rates, ease of handling.

At your convenience . . without cost or obligation to you . . a Selas field engineer would welcome the opportunity to survey your needs. For this personal service—or for a copy of our new Bulletin 210 "Selas Gradiation Heating in the Steel Mill"—Write to Mr. J. F. Black, Manager of Sales, Steel Mill Div., Selas Corporation of America, Dresher, Pa.

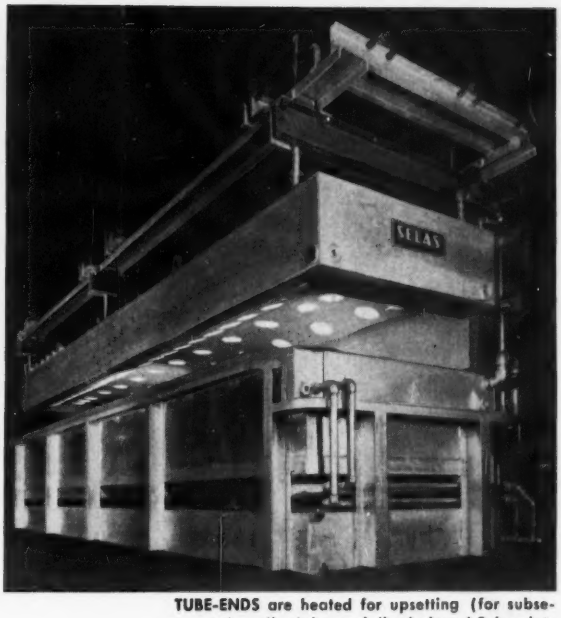
Gradiation and Duradiant are registered trade names of Selas Corporation of America.

SUBSIDIARIES: Selas Constructors, Inc., Houston, Texas; Selas Corporation of America, European Div., S. A., Pregny, Geneva, Switzerland. **INTERNATIONAL REPRESENTATIVES AND LICENSEES:** CAMBODIA, FORMOSA, KOREA, LAOS, VIETNAM—Casa Export Co., Inc.; AUSTRIA, GERMANY—Indugas, Essen; JAPAN—International Machine Co., Ltd., Tokyo; ITALY—Italiana Gasogeni E. Forni S.r.l., Milano.

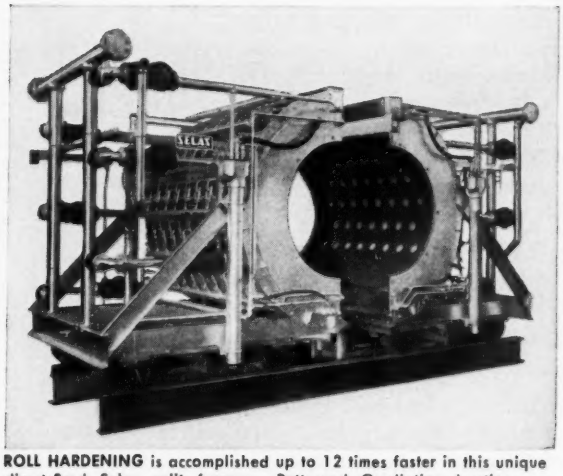
is your reward



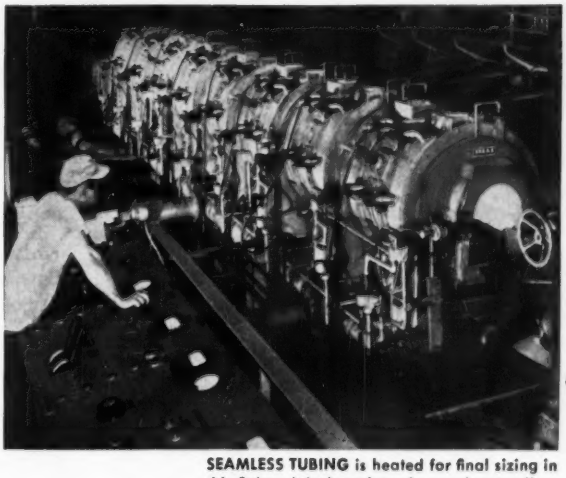
STEEL BILLETS, 3½ to 4¼ in. square cross-section, 3.4 to 10.8 in. long, are heated for hot working in this Gradiation rotary hearth. Compact furnace occupies 60% less floor space than required by conventional heat-and-soak equipment to achieve production rate of 11,000 lb per hr. Scale loss is 85% less. Entire heating cycle—as well as charge, discharge, transfer and press loading—is automated and synchronized with press operations.



TUBE-ENDS are heated for upsetting (for subsequent threading) in specially-designed Selas slot-type furnaces. As each tube-end is fast heated to upsetting temperature, the tubing automatically moves down the handling table to the upsetting machine. The direct-fired Duradiant® gas burners are patterned to assure temperature uniformity within a controlled section of each tube-end.



ROLL HARDENING is accomplished up to 12 times faster in this unique direct-fired Selas split furnace. Patterned Gradiation heating . . coupled with the ability to rotate rolls during heating and quenching cycles . . assures attainment of a controlled pattern of hardenability. Heat-up time is so rapid that harmful scale is eliminated. Even-heat distribution prevents formation of soft spots. Protection of roll shoulders leaves them unaffected by heat processing of roll barrel. Rolls up to 60 in. in diameter and a wide range of barrel lengths can be hardened.

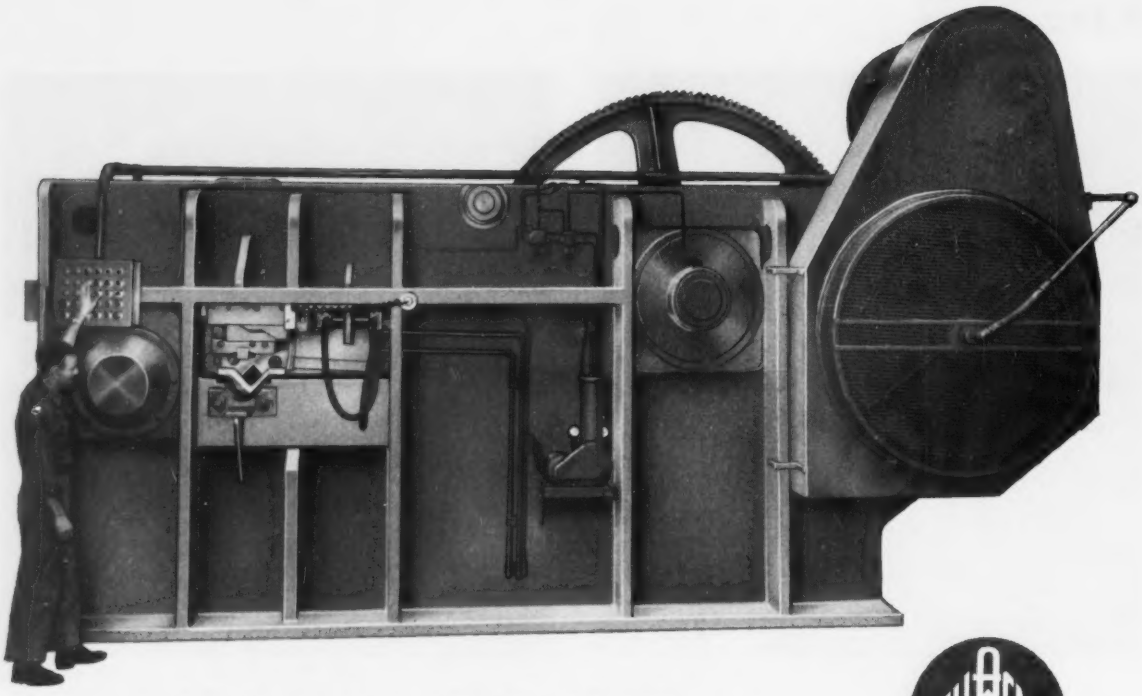


SEAMLESS TUBING is heated for final sizing in this Selas eight-barrel continuous furnace line. Three zones of automatic control assure that the heavy-walled tubing . . up to 16 in. O.D. and 3 in. wall thickness . . is brought precisely to predetermined temperature, throughout each length of tubing . . consistently uniform from tube to tube.

SELAS CORPORATION OF AMERICA DRESHER PENNSYLVANIA

Heat and Fluid Processing Engineers

DEVELOPMENT · DESIGN · CONSTRUCTION



HILL ACME
HEAVY DUTY BAR-BILLET SHEAR
for production cutting of heavy billets

SIMPLE DESIGN The No. 1200 HILL ACME BAR-BILLET shear cuts large diameter squares of various tensiles. The basic principle of the lever and fulcrum is employed to insure maximum efficiency with low power input.

HIGH PRODUCTION With a free running speed of 26 cuts per minute the production of square, accurate lengths will appreciably reduce cutting costs.

VERSATILE Knives will accommodate many sizes of rounds, flats, squares or special shapes without the necessity of knife change.

LOW COST Initial machine cost is attractive and maintenance cost comparisons are impressive.

PROVEN EFFICIENCY Now proven through four years of successful operation in nationally known plants. Available with fully automatic, semi-automatic or hand feed.

SIZE RANGE HILL ACME BAR-BILLET shears are made in a range of sizes to efficiently accommodate every commercial requirement. Available in either right or left hand models.

Bulletin BB-59 gives complete details.

The
HILL ACME
Company

Also manufacturers of:
ROTARY SHEARS • "CANTON" ALLIGATOR SHEARS • HILL HYDRAULIC SURFACE GRINDERS • GRINDING & POLISHING MACHINES • "ACME" FORGING • TAPPING MACHINES • "CLEVELAND" KNIVES AND SHEAR BLADES • MECHANICAL LIFTERS

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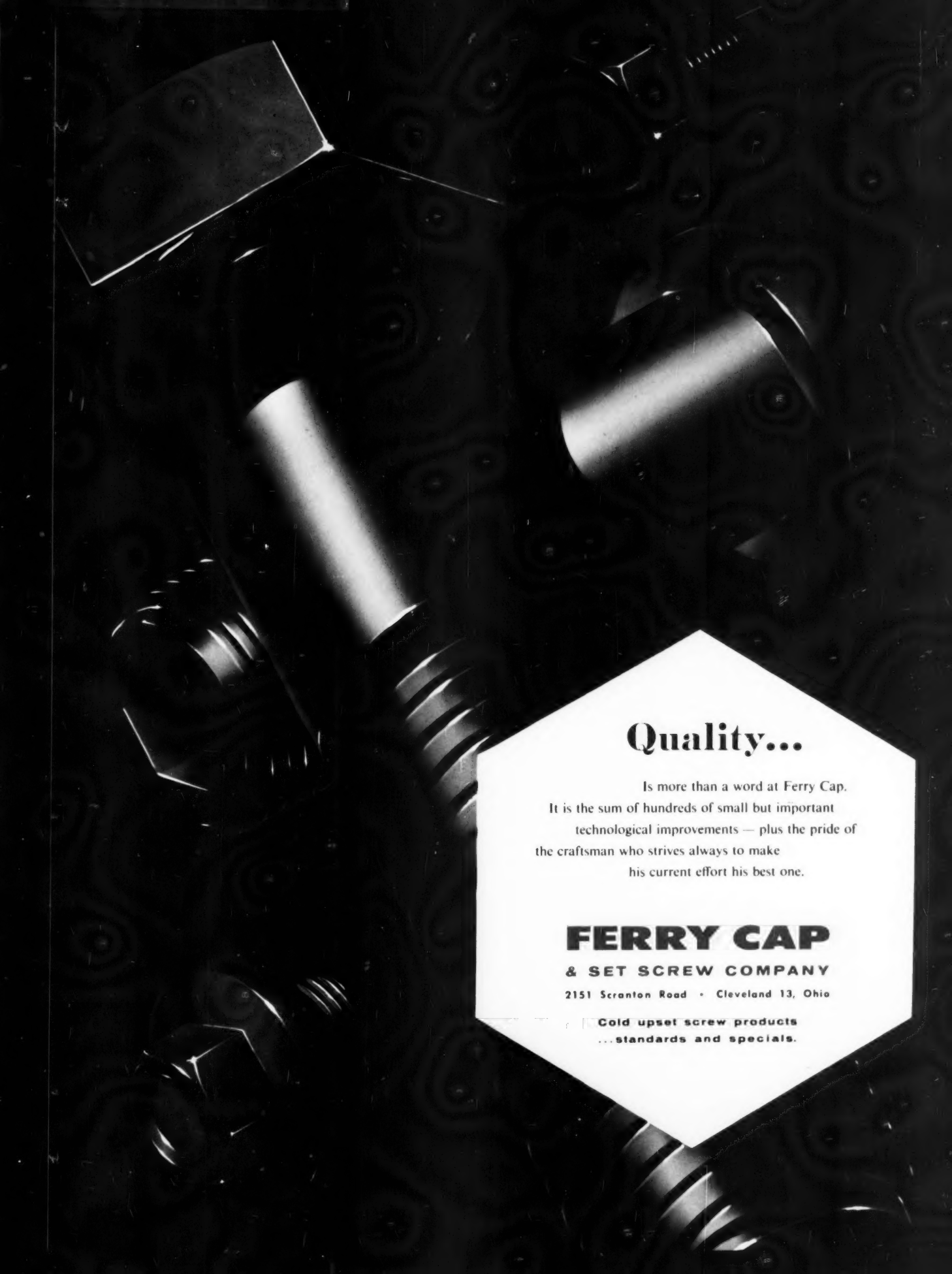
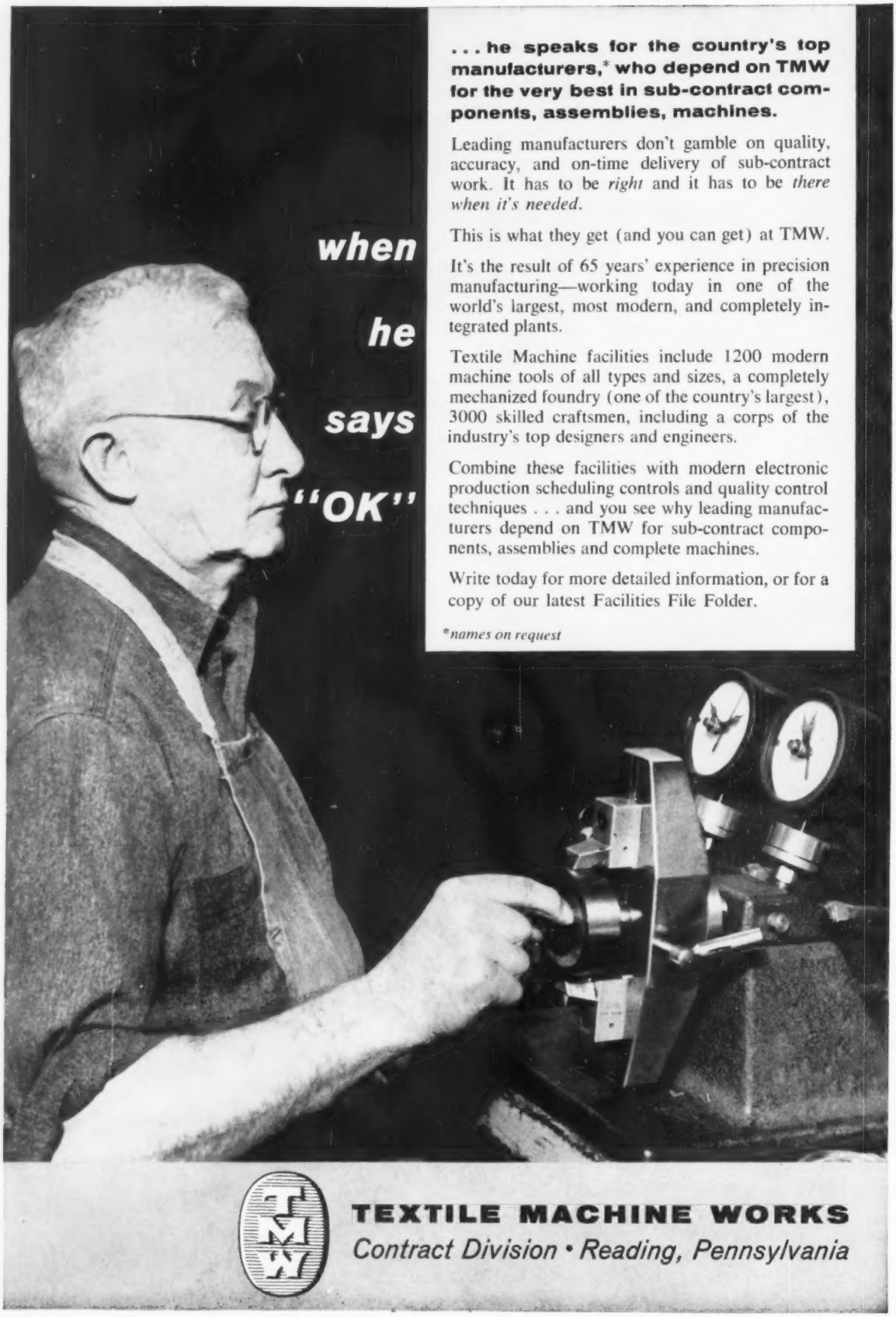

Quality...
Is more than a word at Ferry Cap.
It is the sum of hundreds of small but important
technological improvements — plus the pride of
the craftsman who strives always to make
his current effort his best one.
FERRY CAP
& SET SCREW COMPANY
2151 Scranton Road • Cleveland 13, Ohio
Cold upset screw products
...standards and specials.



. . . he speaks for the country's top manufacturers,* who depend on TMW for the very best in sub-contract components, assemblies, machines.

Leading manufacturers don't gamble on quality, accuracy, and on-time delivery of sub-contract work. It has to be *right* and it has to be *there when it's needed.*

This is what they get (and you can get) at TMW.

It's the result of 65 years' experience in precision manufacturing—working today in one of the world's largest, most modern, and completely integrated plants.

Textile Machine facilities include 1200 modern machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, including a corps of the industry's top designers and engineers.

Combine these facilities with modern electronic production scheduling controls and quality control techniques . . . and you see why leading manufacturers depend on TMW for sub-contract components, assemblies and complete machines.

Write today for more detailed information, or for a copy of our latest Facilities File Folder.

**names on request*

TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania

Built tough

for round-the-clock service in grueling applications

Pre-Bilt conveyors are available in belt widths of 18, 24, 30 and 36 inches. Truss and channel structural frames are designed to AISE standards for spans up to 50 ft. Supporting bents, chutes and other accessories are standardized.

All these advantages from selection to erection with pre-engineered units

EASY SELECTION from standardized Link-Belt components. Your Link-Belt sales engineer will help you select the right combination.

ON-THE-SITE QUOTATIONS by a trained sales engineer. He will prepare a prompt quotation on all components necessary for efficient operation.

LOW FIRST COST. Pre-engineered, shop-assembled components, prompt delivery, fast erection time—all result in lower initial costs.

LOW OPERATING COSTS. Due to rugged design, maintenance normally consists only of lubrication. More economical based on cost per ton handled.

QUICK DELIVERY. Pre-Bilt sectional belt conveyors are manufactured and shipped from one of nine plants located nearest your operations.

FAST, LOW-COST INSTALLATION. Simple construction facilitates field assembly, reducing time and costs of erection.

LINK-BELT Pre-Bilt belt conveyors bring savings from the start

Speed, economical operation and dependability—conveying features required in every industry—are provided by Pre-Bilt Sectional Belt Conveyors. They stand up in the most rugged, full-time operations. And normally the only maintenance required is lubrication.

The same engineering design which has produced some of the world's outstanding conveyor systems is applied to Pre-Bilts. Standardized, shop-assembled components are selected to specifically fit your installation. Simple construction provides ease of handling and erection.

No other conveyor offers such rugged design and economy of operation in bulk materials handling. Call your nearby Link-Belt office for complete information. *Or write for Catalog 2779,* a new "Idea Book" for cutting costs with Link-Belt Pre-Bilt sectional belt conveyors.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,193

Announcement of Major Significance

FOR EVERY USER OF SOCKET HEAD CAP SCREWS

Following exhaustive studies begun in 1954, the socket screw products industry adopted, on April 24, 1959, new dimensional standards for socket head cap screws. Standard Screw Company participated in these studies and concurred in the recommendations approved by leading fastener manufacturers.

Adoption of the new standards, to be known as the "1960 Series", has important implications for every user of socket screws. As a public service Stanscrew will point out these implications . . . not only in relation to its own products, but also to the overall program of the industry.

Differences, Advantages Of New Design

The "1960 Series" has been carefully engineered so there is functional uniformity for all sizes, particularly as it applies to wrenching areas and to the relationship of head diameters to body diameters. For most sizes, as illustrated, this means substantial increases in both head diameter and socket size, and thus provides these advantages over the present design:

1. *Maximum utilization of the fastener's inherent strength . . . larger wrenching area permits application of greater clamping force.*
2. *Increased bearing surface under the head . . . up to 233% more.*
3. *Minimum indentation . . . particularly important with softer metals.*

Should You Convert Now?

Obviously, for many applications, the new design offers important benefits which indicate conversion as rapidly as possible. In some cases, however, existing product design may not accommodate the larger heads . . . or, where socket cap screws are countersunk, revising your countersinking operations may create significant production problems. Stanscrew urges, therefore, that each company learn complete facts on the fastener industry's future plans.

Timetable For Industry Changeover

Stanscrew has already started production of the new "1960 Series". Manufacture of the present (1936) series will continue, however, and they will be available as standard, in-stock items until at least January 1, 1961. At that time, it is now contemplated the "1960 Series" will become the accepted standard throughout industry and the "1936 Series" will then be furnished only when specifically ordered.

When Designing A New Model

For products now on the drawing board, this timetable indicates many manufacturers should plan to use the "1960 Series" as the standard for later production. By making such design provisions, you assure maximum acceptance and minimum difficulty in the future.

For Existing Products

For many existing applications, where socket cap screws are not countersunk, either the 1936 or the "1960 Series" may be used. In frequent cases, improvements of the 1960 design suggest conversion within a short period. In other applications, where the heads are countersunk or where the greater head diameters of the "1960 Series" create a problem, changeover should probably be postponed until a general redesign of your product is scheduled.

Special Stanscrew Marking

To further distinguish its "1960 Series", Stanscrew will knurl heads of all new style socket cap screws with a split herringbone design (as shown). This special marking and the new "1960 Series" box labeling will provide quick identification of these quality fasteners.

For Further Information

Your Stanscrew distributor has the latest facts on the new "1960 Series" and will be happy to discuss them with you. If desired, he also will arrange for a prompt visit from a Stanscrew fastener specialist who will be most happy to go over all aspects of this new industry program as it regards your own particular operation.

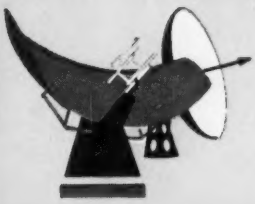
Stanscrew also has a new brochure which provides complete dimensional and design data on the "1960 Series". No obligation, of course, for your copy.

STANSCREW FASTENERS

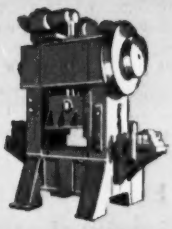
CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

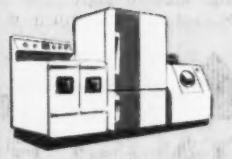
to help you



make more

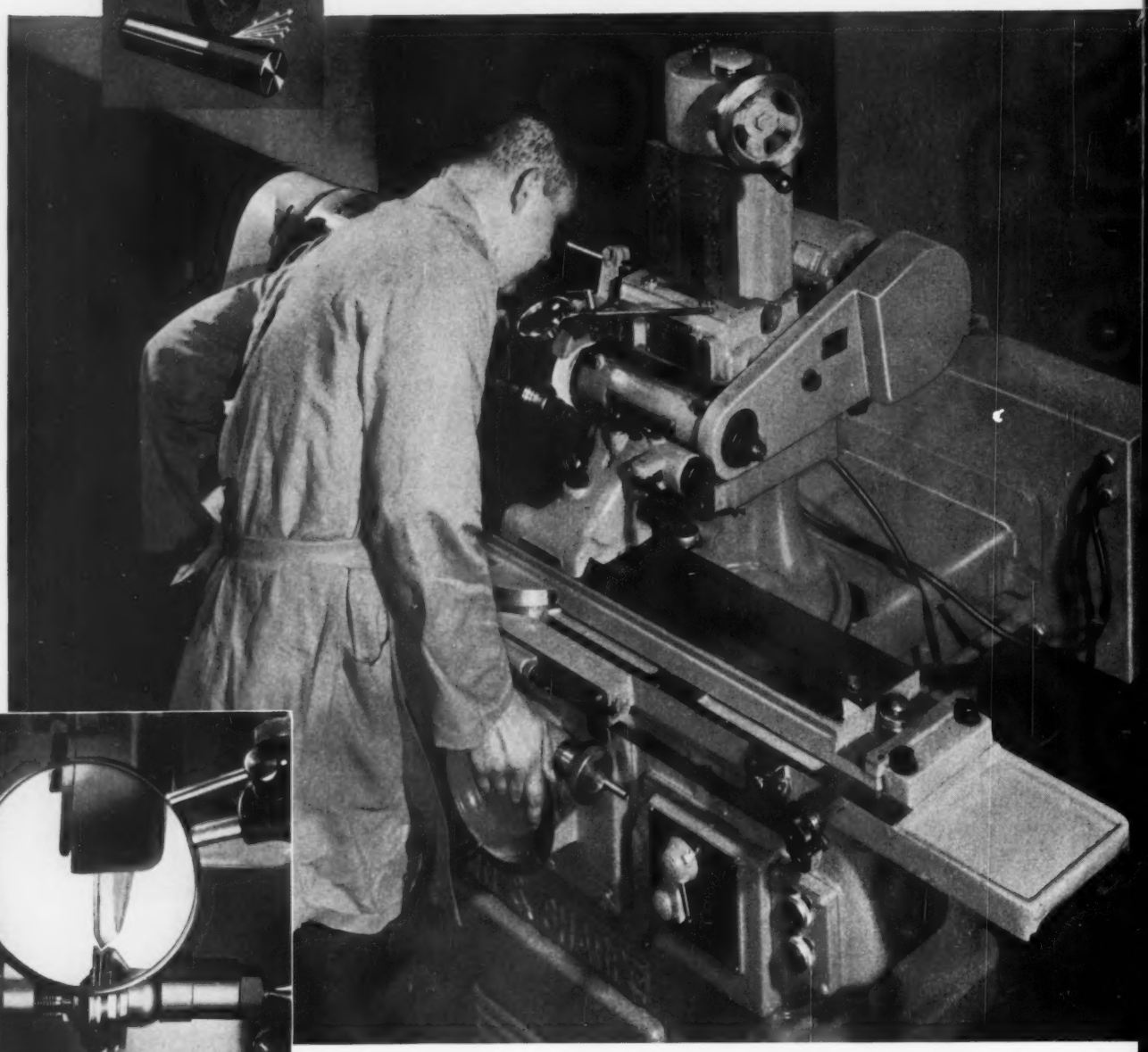


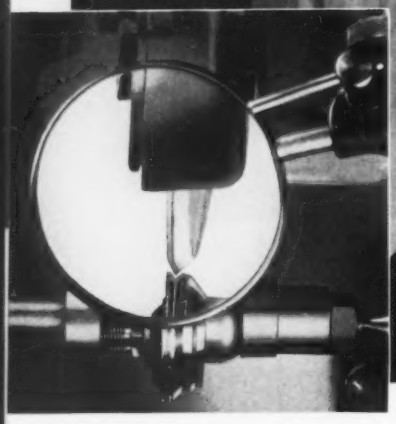
for less . . .



Brown & Sharpe PRECISION CENTER

TO HELP YOU GRIND MORE FOR LESS





Two-machine output from single-machine investment—No. 13 tool grinder doubles for production

The Brown & Sharpe No. 13 Universal and Tool Grinding Machine is the leading choice in its class for all-around utility. Watch it turn out the work anywhere it's installed, and you'll see why.

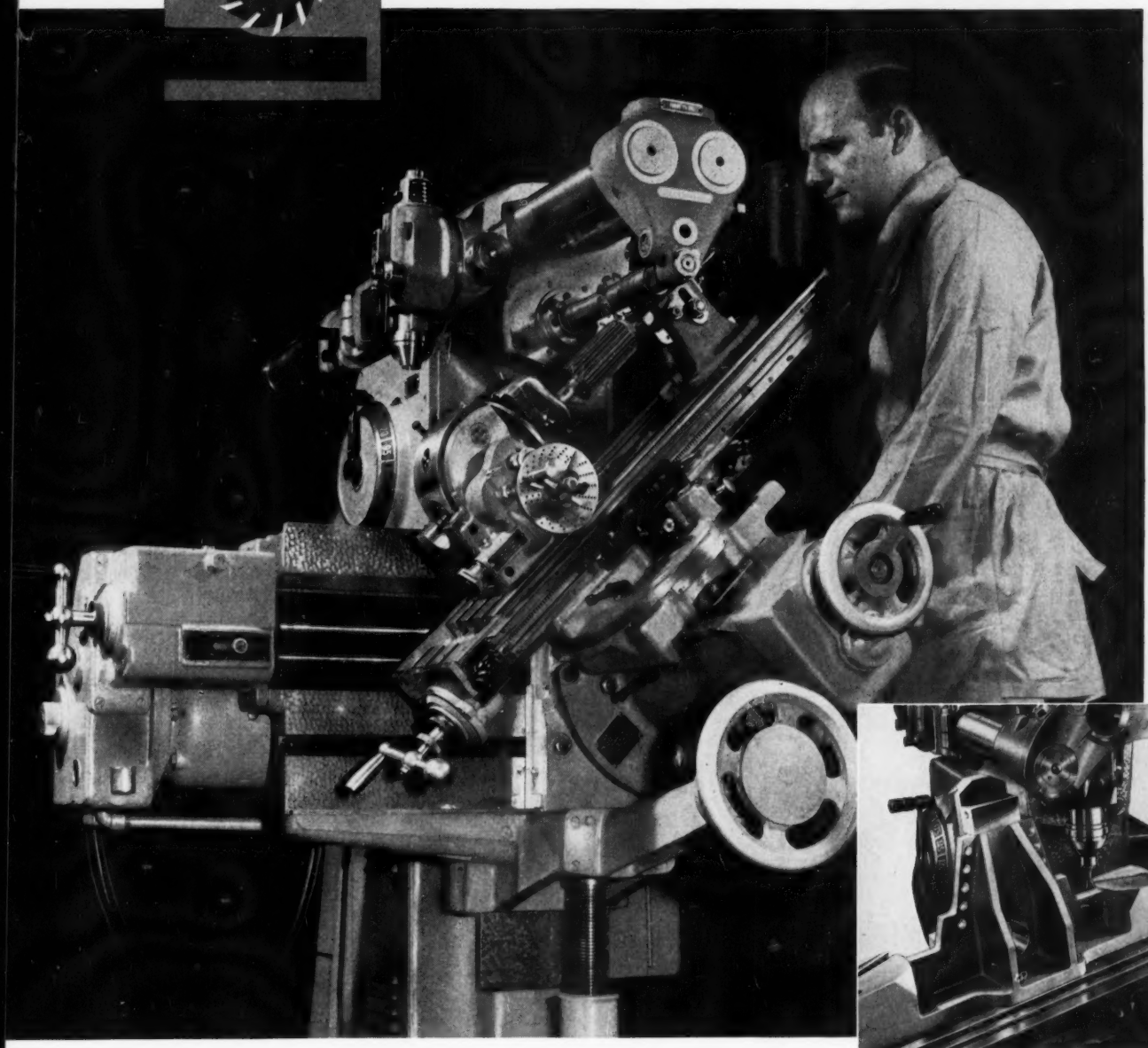
It grinds helical and formed cutters, end mills and side mills—meets every need for tool sharpening. It is industry's favorite for circular form tool grinding. It offers unlimited adaptability for tool and die making, and for grinding parts needed in experimental, prototype, and repair work. In addition, it has ample capacity for a wide variety of light production grinding.

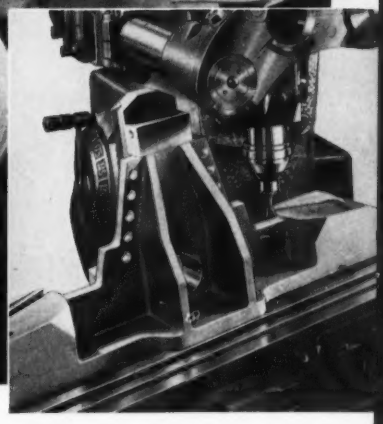
Now, new improvements in drive design further increase its proved efficiency. Find out how the No. 13 can start saving for you.

For details, write: Machine Tool Division, Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Brown & Sharpe PRECISION CENTER

TO HELP YOU MILL MORE FOR LESS





The Omniversal makes the cuts that "can't be done" - meets today's demands for toolroom milling

The Brown & Sharpe Omniversal Milling Machine is a standard machine "made-to-order" for the complex milling increasingly required in toolroom, experimental, and prototype work. Nothing else can match its combination of work-range, versatility, and dependable accuracy.

It simplifies the multi-operation jobs—permits milling at various angles without relocating work—saves set-up time. It handles spiral taper and other complex cuts that are impossible on other machines. Plenty of capacity, too —with a total horizontal feed of 34″, and a 15″ vertical adjustment.

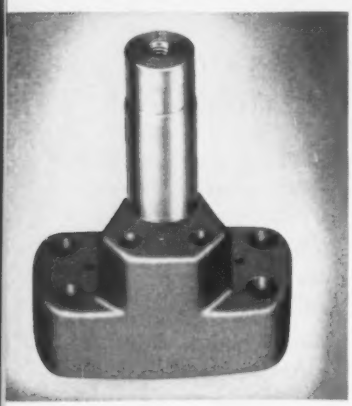
When you invest in toolroom milling equipment, get the machine that will do *all* the work, and pay top returns in dollars saved . . . get the Omniversal.

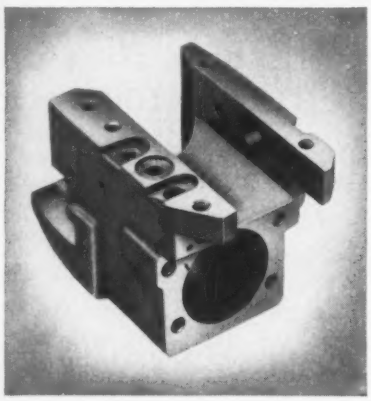
For details, write: Machine Tool Division. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Brown & Sharpe 125 PRECISION CENTER

TO HELP YOU DRILL MORE FOR LESS

Two sizes: Model A (shown) 6 spindles • ½" drilling and tapping capacity in steel • table work surface 22" x 24". **Model B** 6 spindles • 1" capacity in steel • table work surface 28" x 32" • may be equipped with any standard numerical (tape) control system for fully integrated automatic work positioning and machining.





Drill • tap • bore • ream... 2 to 5 times faster

Turret drilling, developed by Brown & Sharpe's newest division, is the revolutionary system for production drilling operations that can save up to 80% of your costs for conventional gang-drill box-jig methods.

Multiple drilling operations are performed at a single station, with one set-up. Brown & Sharpe Work-positioning Tables permit accurate duplication of any hole pattern, eliminate need for expensive box jigs. You save work transfer and set-up time. You save on tool wear and maintenance. You save floor space, and reduce your capital investment. In many installations, Brown & Sharpe Turret Drilling equipment has paid for itself in a year or less.

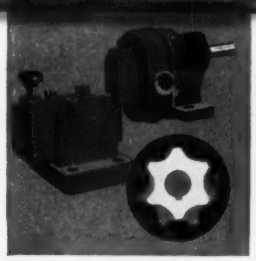
Write for complete information, and ask for estimate of savings you can make by tooling up for B&S Turret Drilling. Brown & Sharpe Turret Drilling Division, Inc., 20 Fitch St., East Norwalk, Connecticut.

The Stanley Works speeds drilling production with Brown & Sharpe Turret Drilling Machines

At The Stanley Works, New Britain, Conn., B&S Model A Turret Drilling Machines are used to lower costs of drilling component parts for the pneumatic operating units of the famous Stanley MAGIC-DOOR Controls. In the spindle (left), an SAE 1035 steel forging, four .432" holes are drilled and reamed, two .307" holes drilled and reamed, and two .149" holes drilled — 14 operations in 4 minutes. The B&S Work-positioning Table and the simple holding fixture assures accurate hole location.

In the cylinder block (right), 11 holes are drilled and tapped, 1 hole drilled and counterbored, and 5 holes drilled. All 17 holes — 29 operations in four planes — are completed in 7 minutes.

Brown & Sharpe PRECISION CENTER



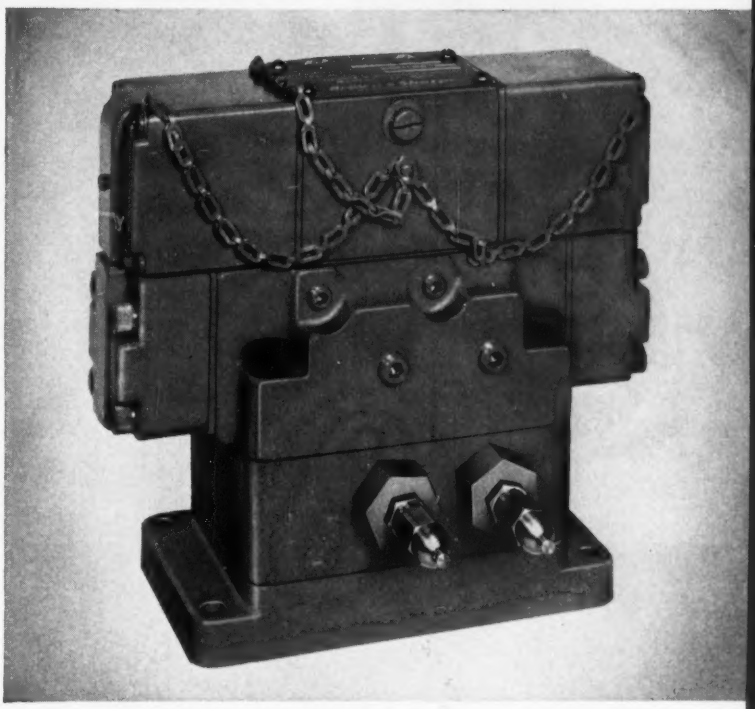
TO HELP YOU HANDLE FLUIDS
MORE EFFICIENTLY... AND FOR LESS

New Double A "Circuit-Stak" Valves save up to 75% of installation costs

Circuit-Stak valves are a new Brown & Sharpe concept: a "sandwich" of several valves required for a hydraulic circuit, assembled in one compact unit on a single sub plate.

You save up to 75% of the usual installation cost for separate valves, because Circuit-Stak installs as easily as a single valve — eliminates separate mountings and piping runs. Valves in the sandwich can be easily removed or replaced.

For literature on Double A hydraulic control valves, power units, Gerotor pumps, write Double A Products Co., a subsidiary of Brown & Sharpe Mfg. Co., Manchester Michigan.



Above: Simple Circuit-Stak combining double flow control valve, "sandwiched" under 4-way valve, costs about $36 less to install than if valves were separately mounted.

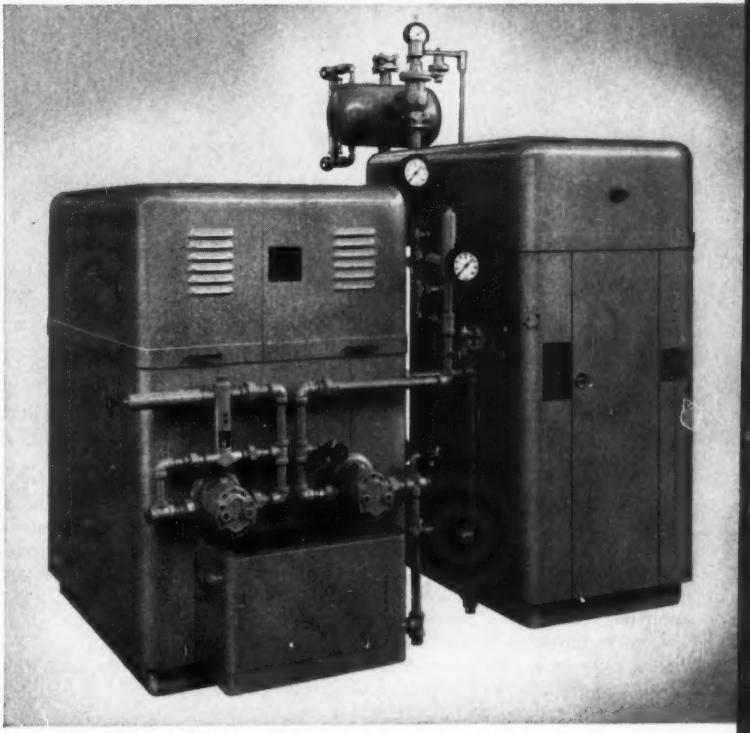
Below: Famous Votator chilling and plasticizing units for shortening and lard are manufactured by Girdler Process Equipment Division, Chemetron Corporation, Louisville, Ky.

B&S "stock" pumps meet tough requirements in "Votator" units

The reasons why Brown & Sharpe rotary geared pumps have been built into "Votator" vegetable-shortening and lard processing units for over 15 years, are important to any pump user . .

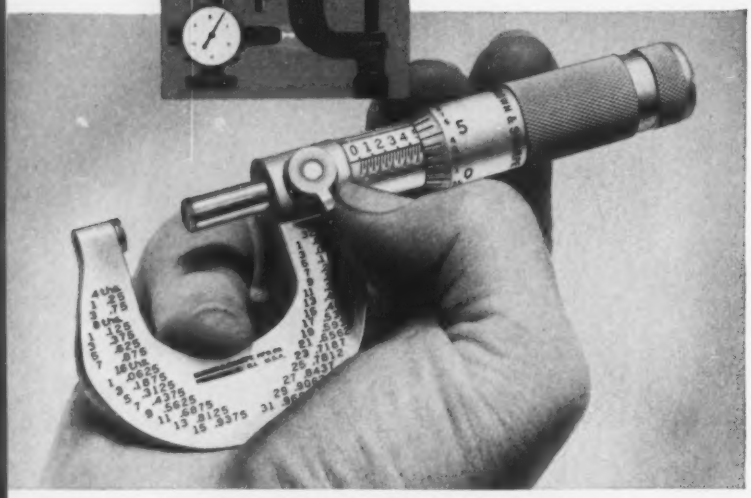
First, B&S tolerances between moving parts are so close that they reduce slippage of hot oils to an absolute minimum — at 250-300 psi. Second, B&S fine internal finishes assure extra-long service life. Equally important, the B&S pumps that meet Votator requirements so well are *inexpensive* — available right from stock.

Send for your copy of the new Catalog No. 36P, which describes the complete line of B&S gear, vane and centrifugal pumps. Brown & Sharpe Mfg. Co., Providence 1, R. I.



Brown & Sharpe PRECISION CENTER

TO HELP YOU MAKE PRECISION MEASUREMENTS EASIER AND FASTER...



New Brown & Sharpe Convertible Thimble Micrometer

Precision Tool News

3 new B&S features make this the world's most advanced micrometer

Only in Brown & Sharpe's new Convertible Thimble Micrometer do you get these 3 important features for convenience and accuracy . . .

First, you can use either of two measuring "feels" in the same micrometer. By just turning a friction control, you convert in seconds to "friction" feel or . . . direct feel (knurled sleeve locked to thimble.)

Second, you use this mike, easily, in one hand. The friction sleeve is placed where you can reach it without stretching, and the new lever-type lock works with your thumb.

Most important, for accuracy, are the new oblique (slanting) barrel graduations. By showing "where you're going and where you've been", they prevent the .025", one-revolution errors that often occur when older style, straight graduations are hidden. Range is 0-1", in .0001".

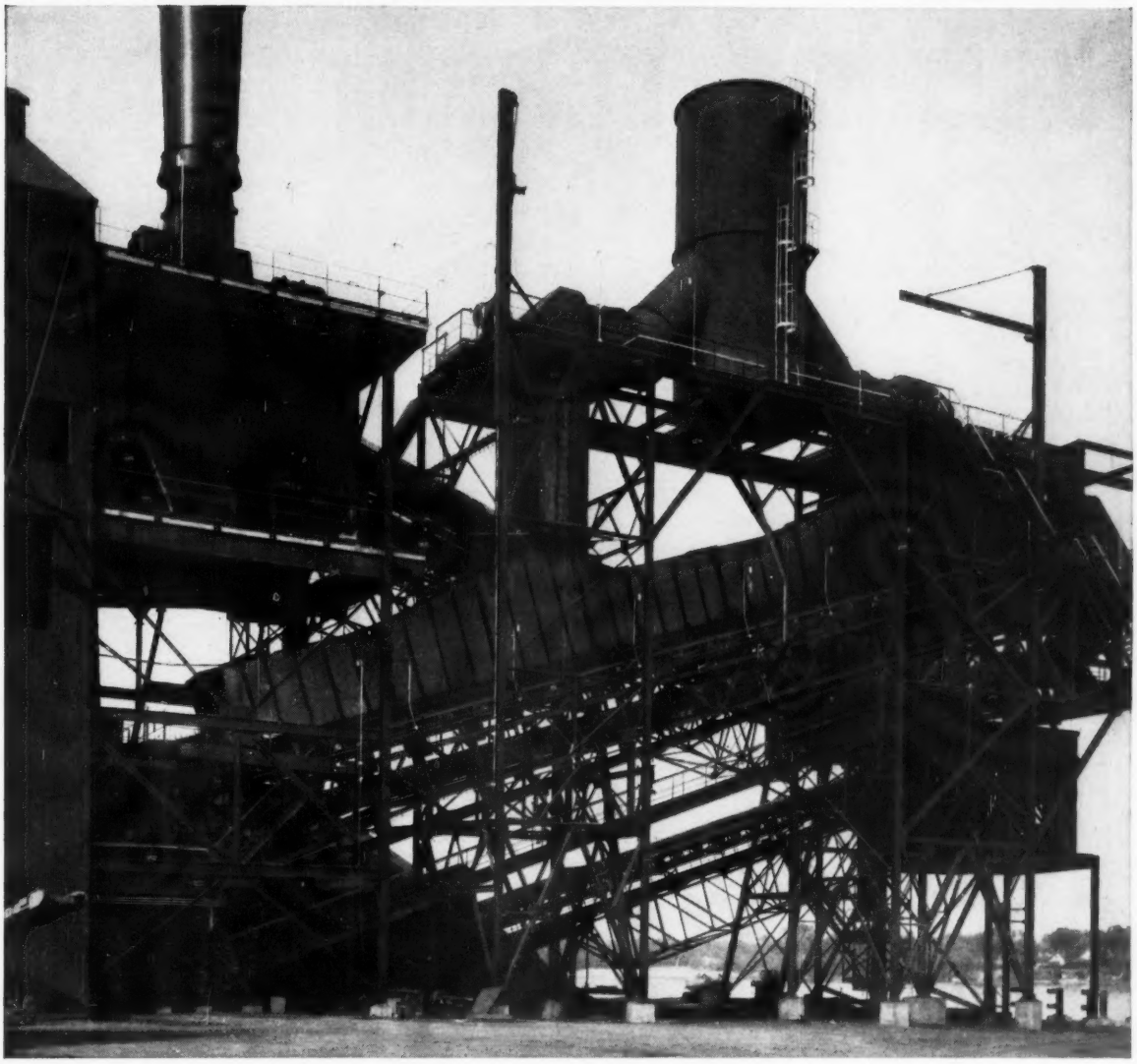
New Intrimik measures diameters in .0002" to bottom of blind bores. This Style B Intrimik is an advanced version of the famous internal tri-point micrometer that Brown & Sharpe introduced 5 years ago. It is very versatile because it measures diameters, directly, right to the bottom of holes — extra long-lasting because measuring points and all wearing parts are carbide; wear adjustments are provided. Self-centering, self-aligning points are protected from damage by not protruding beyond end of head. Available in six sizes, with setting rings and extensions — individually or in sets — for measuring diameters from .600" to 2.400" in .0002", to depths of 14". Accurate over full range to .00015".

New Brown & Sharpe pre-colored flat stock saves time

Brown & Sharpe's new Ready Mark precision ground flat stock comes with a smooth, rust-resistant colored finish — ready for scribing. You save degreasing, coloring, drying time. Coating instantly identifies stock; it's blue for oil-hardening, maroon for air-hardening stock.

Ask your local Brown & Sharpe distributor to show you these products, available quickly from his stock. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Brown & Sharpe PRECISION CENTER



sinter air-cooled and elevated at same time . . .

DRAVO-LURGI STRAIGHT LINE COOLER

Utilizing the air-cooling principle which delivers more *usable* tonnage, the Dravo-Lurgi straight line cooler raises sinter at the discharge end for storage in bins or for conveying. Output is increased by reduction of shattering and dust.

Where space permits its installation, the straight line design provides an extremely efficient method for both cooling and handling sinter. Here are some of the features which lead to maximum utilization of any sinter machine:

- No water quenching to cause shattering, cracking or brittleness.
- No need for plows or scrapers at the discharge end.
- Sinter is undisturbed during cooling—breakup is minimized.
- Sinter is elevated while cooling, facilitating loading.

A Dravo engineer will be glad to explain how Dravo-Lurgi coolers (either straight line or circular) can increase *usable* tonnage in your sintering operation. Write or phone DRAVO CORPORATION, PITTSBURGH 22, PENNSYLVANIA.

DRAVO

CORPORATION

DRAVO/LURGI

Blast furnace blowers • boiler and power plants • bridge sub-structures • cab conditioners • docks and unloaders • dredging • fabricated piping foundations • gantry and floating cranes • gas and oil pumping stations • locks and dams • ore and coal bridges • process equipment • pumphouses and intakes • river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

Now...hard-hitting support for

Look for this new 4-color advertisement in...
LIFE October 19 32,000,000 readers
BETTER HOMES & GARDENS November 16,000,000 readers
THE AMERICAN HOME November 12,000,000 readers
60,000,000 prospects for aluminum building products
Which of these 24 money-saving ideas should you consider before remodeling?
FREE!
Aluminium Limited
Unusual tear-out, postage-free coupon offers new aluminum products booklet

...will attract thousands of inquiries for aluminum building products

your aluminum product sales!

60,000,000 prospects— over 2/3 of the nation's homeowners are the target of this new national advertising by Aluminium Limited . . .

. . . created to seek out immediate prospects for aluminum products made by you and your customers!

Watch your sales opportunities skyrocket in October and November—

when this exciting 4-color spread breaks in LIFE . . . BETTER HOMES & GARDENS . . . and THE AMERICAN HOME!

The advertisement is aimed at 60 million prospects for aluminum building products. And in this group are more than 2/3 of the nation's homeowners.

This new national advertising is created to increase retail sales, thereby increasing sales throughout the entire aluminum industry. The advertising does this by showing the many exciting ways the homeowner can use aluminum. And to provide the tie-in at the retail level, there's an unusual tear-out coupon offer for the new 36-page booklet, "How to remodel on a budget . . . with aluminum."

Experience tells us we can expect as many as 150,000 inquiries for the booklet. A list of inquiries, broken down by product and geographical area, will be passed on to the nation's retailers by our U.S. fabricator customers.

Aluminium Limited

ALCAN

Ingot Specialist...serving American Aluminum Fabricators—

In the U.S.—Aluminium Limited Sales, Inc., 630 Fifth Avenue, N.Y. 20, N.Y.
CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • ST. LOUIS

NEW GARDNER-DENVER TRU-THREAD TAPPERS

Tru-Thread Tapper with mounting bracket for stationary applications.

Tru-Thread Tapper with nosepiece for portable applications.

...CUT COSTS IN PRODUCTION TAPPING

TIME TO TALK COST SAVING

When you keep in touch with your Gardner-Denver air tool specialist, you keep in touch with the latest developments in new methods and machines to cut production costs. This is the foundation of our 100-year philosophy of growth—at Gardner-Denver there's no substitute for men.

Quality performance

Now precision tapping of clean, accurate threads is quick, easy and economical with new Gardner-Denver air-powered, positive-feed Tru-Thread (T.M.) Tappers. "Controlled-pitch" lead screw feed prevents tearing or stripping of threads and tap breakage. With Gardner-Denver "controlled pitch," Model 93B Series tappers consistently produce threads of Class 3 fit quality. Single control starts completely automatic cycle.

Portable or stationary mounting

Mount the Tru-Thread Tapper on a simple jig or automatic machine and get low-cost, *precision* thread cutting. Keep your machine tools efficiently occupied with other work.

For portable applications, simply add a nosepiece for use with self-locking drill bushing tip. One man can easily take the tool to the work . . . from job to job.

Designed specifically for production thread cutting, the Tru-Thread Tapper is the ideal solution to all tapping problems in hole sizes from No. 2 to 1" diameter. Ask a Gardner-Denver special machines engineer how this versatile air tool can be incorporated into a fully automated unit. For complete details, request Bulletin 93-31.

GARDNER-DENVER Since 1859 — 1959 YEARS

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

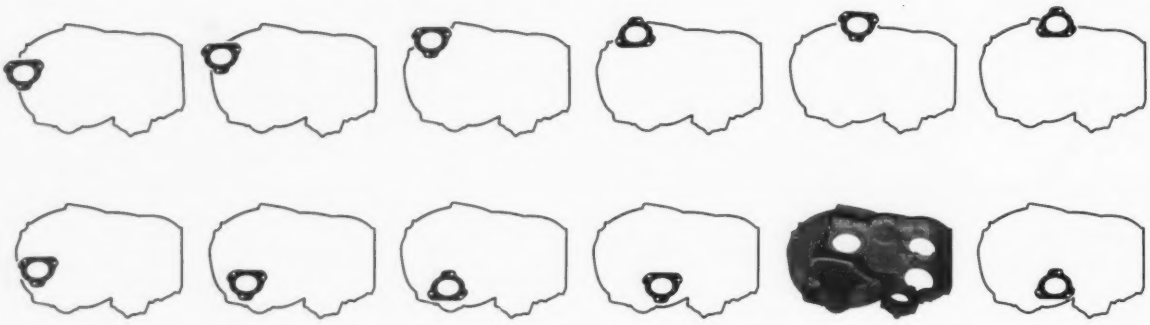
Right now! Numerical control like this can produce for you

. . . Turn the page to see how this Natco does it.

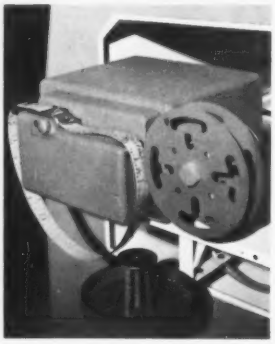
Tape Control Speeds Production

This workpiece comes in many varieties . . .

One multi-spindle Natco machines them all



Numerical control for the production line? Sure! And it's paying its way machining starter holes in over 160 different flywheel housings for small diesels. Even though the starter mounting pads are located differently on each of the housings, this Natco handles each new part with equal ease. It bores the hole for the starter pinion shaft; drills and taps three mounting holes around it.

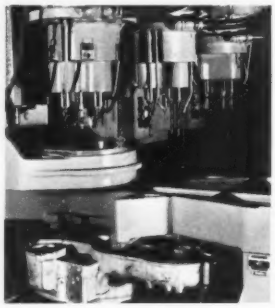


That's the beauty of tape control—the flexibility it gives machine tools like this three column Natco special. Here's practical automation for small lot production!

It's easy and fast to change to a different part. Just substitute a new tape loop in the reader and rotate the drillheads to the new setting. In minutes you're cutting metal again.

No battery of expensive fixtures needed with this machine—the tape locates the part under the drillheads by controlling the motion of the worktable. And inventory can be cut to the bone because even small lots of service parts are run at production part cost.

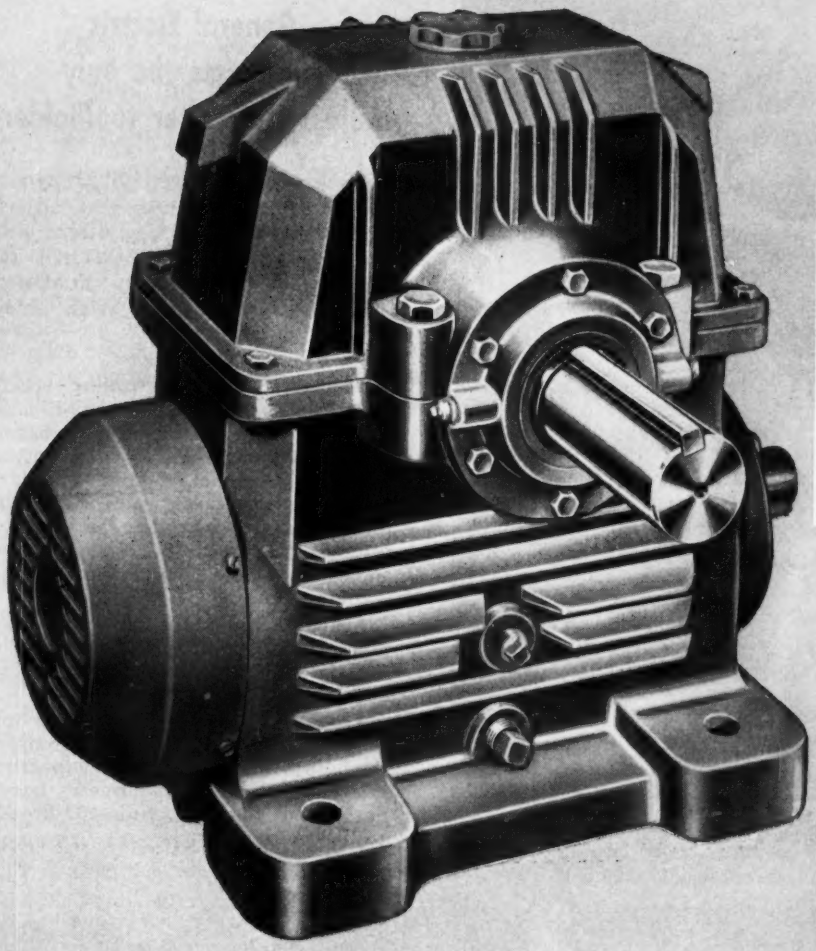
Production lines don't have to wait until tomorrow for numerical control. It's here now, and now is the time to gain the greatest advantage. Let us show you how it can be used to speed your boring—drilling—facing—tapping—reaming jobs. Call your Natco representative today, or write for details.



NATCO NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, IND.

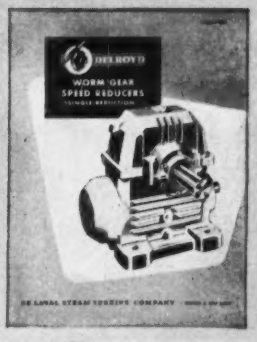
DELROYD
SPEED REDUCERS

De Laval Announces All New Line of Single Reduction Speed Reducers



DELROYD
TYPE B
fan cooled
5" through 12"
center
distance
★

Send for this new 32-page Bulletin 3805 today.

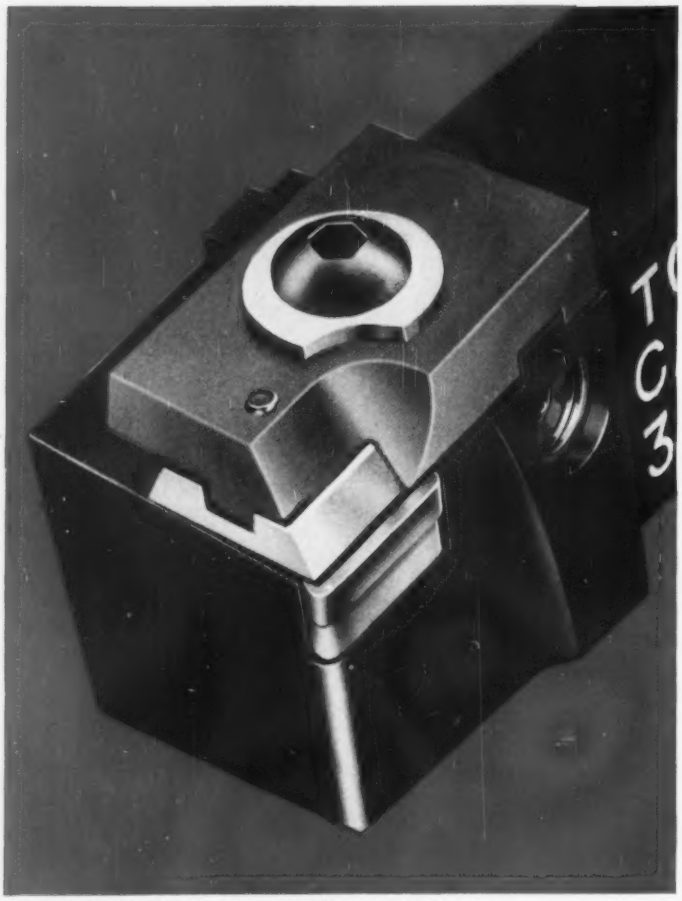


New Delroyd single reduction speed reducers are available in a wide range of sizes and horsepower ratings. These worm gear units include centrifugally cast gears and fan cooling, and carry *the new AGMA ratings.*

DE LAVAL *Steam Turbine Company*
860 NOTTINGHAM WAY, TRENTON 2, N. J.

DL 479

Two great cutting BETTER PROFITS



*Sizes 16V and 85V: adjustable range 1/16" to 7/32"
Size 20V: adjustable range 1/16" to 11/32"

1

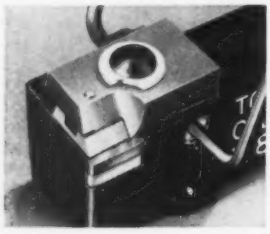
General Electric announces the only Adjust-O-Breaker toolholder

Carboloy® toolholder with adjustable chipbreaker lets you adjust from any angle . . . offers any desired adjustment within its range* . . . features "floating" indexable chipbreaker with absolute repeatability.

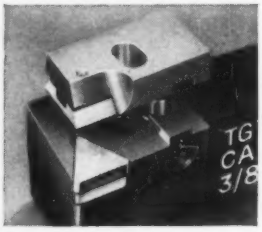
MORE jobs with LESS tooling—that's what this new Carboloy Adjust-O-Breaker toolholder means! No need now to have a separate chipbreaker for every cutting job. No need, either, to limit yourself to toolholders with only two or three chipbreaker settings. Now you can have this versatile new Carboloy toolholder and adjust it for *any* chipbreaker setting within its range.*

Available from stock in 5 styles, negative rake, for left- and right-hand machining, the Adjust-O-Breaker holder brings new meaning to disposable tooling.

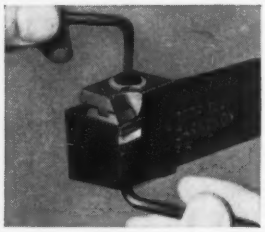
So, if you want to handle *more* jobs with *less* tooling, look into the complete Carboloy line—Lift-O-Matic (positive rake, negative rake, and tracer), heavy-duty, and the new Adjust-O-Breaker toolholder.



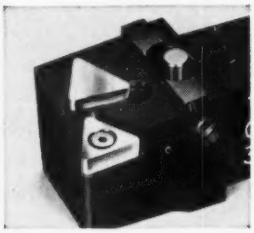
1. Chipbreaker setting is adjustable to any width within its range.* Set screw with two open ends provides access from either side. No springs to adjust.



2. Design permits absolute repeatability of settings. Floating chipbreaker is indexable. Can't drop out when clamp is loosened.



3. Clamp screw is accessible from top or bottom; allows easy indexing or replacement even when toolholder is vertical or upside down.



4. Standard disposable inserts, Carboloy insert seats and convertible seat are used with toolholder. Insert seats are indexable and self-aligning.

tool developments that mean
THROUGH BETTER TOOLING

2

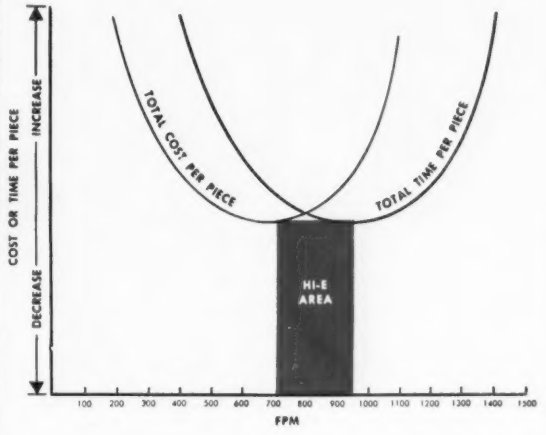
Here's how Hi-E machining pays big dividends . . . giving you BETTER PROFITS THROUGH BETTER TOOLING

In the light of current high manpower and equipment costs, carbide tools are low cost by comparison. Profitable operations result from the efficient combination of tool costs, manpower costs, and machine costs. In other words, tool costs should *not* be the only factor in setting up a job . . . rather, most efficient machining methods should be a major consideration. This calls for Hi-E!

Quickly defined, the Hi-E (**Hi**gh-Efficiency) machining practice brings together *all* factors to provide a range of cutting speeds for a given job to obtain (1) lowest cost-per-piece machined, or (2) reduced floor-to-floor time. Really, then, Hi-E machining can help you obtain the economical balance between *lowest possible cost* and *greatest possible production rate.*

The Hi-E area (see illus.) shows optimum speeds to obtain this balance. It is represented by an area on the chart between the lowest points on a total-*cost*-per-piece curve and a total-*time*-per-piece curve.

How can *you* employ Hi-E to get BETTER PROFITS THROUGH BETTER TOOLING? Talk it over with your Carboloy representative. He'll be glad to go into detail on Hi-E machining as it applies to *your* operation. Or write directly for your free copy of our detailed Hi-E booklet.



Hi-E principle is illustrated by the curves on this chart. The low points of the two curves mark the boundaries of the high-efficiency range.

Broadest tooling line in the industry!

The complete quality line of Carboloy toolholders, inserts, insert seats, convertible seats, and brazed tooling is the broadest in the industry — designed to meet *every* tooling need!

Make your goal better profits through better tooling! Check with your Authorized Carboloy Distributor. He's listed in the Yellow Pages. *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

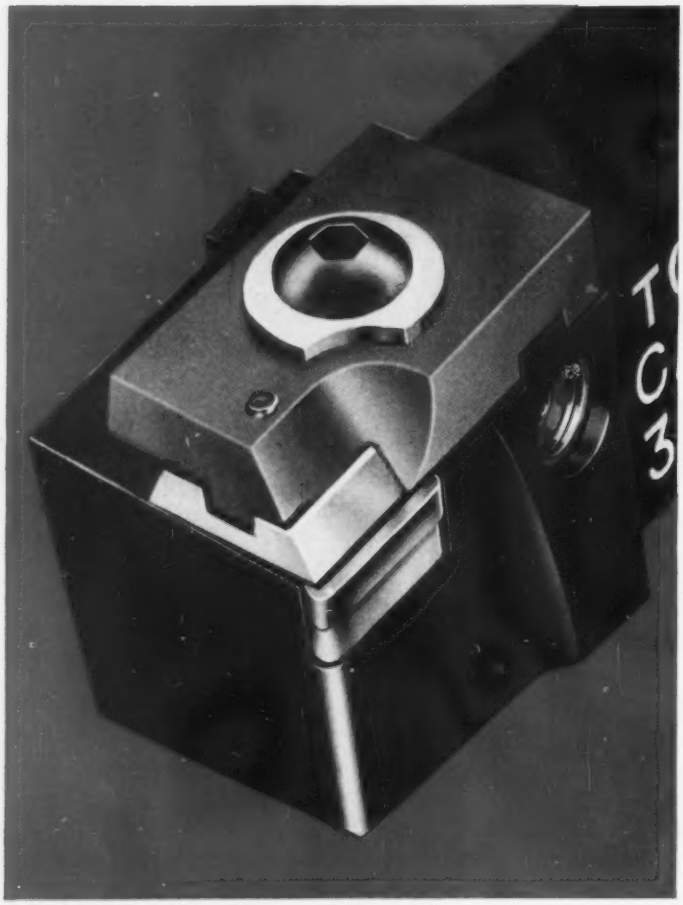
CARBOLOY
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Two great cutting BETTER PROFITS



*Sizes 16V and 85V: adjustable range 1/16" to 7/32"
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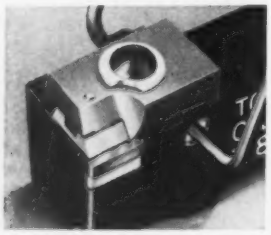
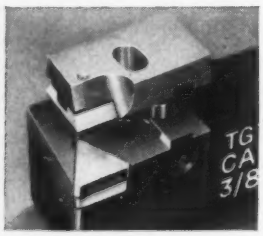
MORE jobs with LESS tooling—that's what this new Carboloy Adjust-O-Breaker toolholder means! No need now to have a separate chipbreaker for every cutting job. No need, either, to limit yourself to toolholders with only two or three chipbreaker settings. Now you can have this versatile new Carboloy toolholder and adjust it for *any* chipbreaker setting within its range.*

Available from stock in 5 styles, negative rake, for left- and right-hand machining, the Adjust-O-Breaker holder brings new meaning to disposable tooling.

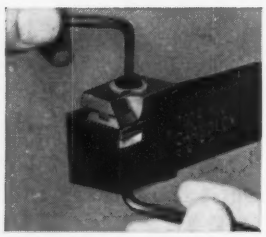
So, if you want to handle *more* jobs with *less* tooling, look into the complete Carboloy line—Lift-O-Matic (positive rake, negative rake, and tracer), heavy-duty, and the new Adjust-O-Breaker toolholder.



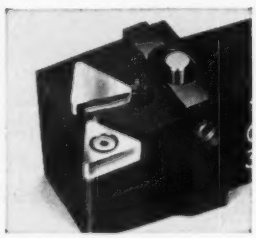
1. Chipbreaker setting is adjustable to any width within its range.* Set screw with two open ends provides access from either side. No springs to adjust.



2. Design permits absolute repeatability of settings. Floating chipbreaker is indexable. Can't drop out when clamp is loosened.



3. Clamp screw is accessible from top or bottom; allows easy indexing or replacement even when toolholder is vertical or upside down.



4. Standard disposable inserts, Carboloy insert seats and convertible seat are used with toolholder. Insert seats are indexable and self-aligning.

tool developments that mean
THROUGH BETTER TOOLING

2

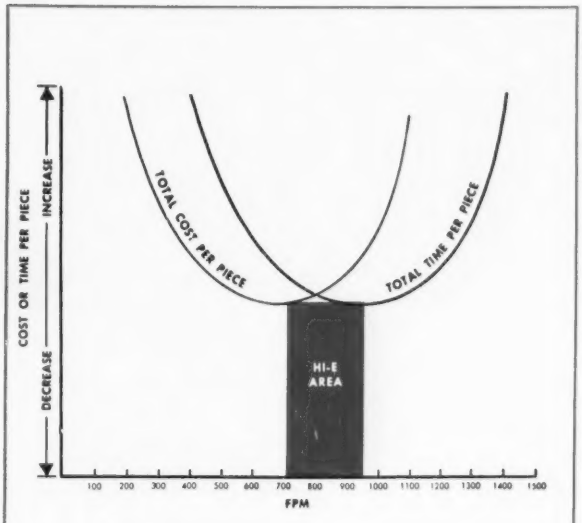
Here's how Hi-E machining pays big dividends . . . giving you BETTER PROFITS THROUGH BETTER TOOLING

In the light of current high manpower and equipment costs, carbide tools are low cost by comparison. Profitable operations result from the efficient combination of tool costs, manpower costs, and machine costs. In other words, tool costs should *not* be the only factor in setting up a job . . . rather, most efficient machining methods should be a major consideration. This calls for Hi-E!

Quickly defined, the Hi-E (**Hi**gh-**E**fficiency) machining practice brings together *all* factors to provide a range of cutting speeds for a given job to obtain (1) lowest cost-per-piece machined, or (2) reduced floor-to-floor time. Really, then, Hi-E machining can help you obtain the economical balance between *lowest possible cost* and *greatest possible production rate.*

The Hi-E area (see illus.) shows optimum speeds to obtain this balance. It is represented by an area on the chart between the lowest points on a total-*cost*-per-piece curve and a total-*time*-per-piece curve.

How can *you* employ Hi-E to get BETTER PROFITS THROUGH BETTER TOOLING? Talk it over with your Carboloy representative. He'll be glad to go into detail on Hi-E machining as it applies to *your* operation. Or write directly for your free copy of our detailed Hi-E booklet.


COST OR TIME PER PIECE
INCREASE
DECREASE
TOTAL COST PER PIECE
TOTAL TIME PER PIECE
HI-E AREA
100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500
FPM

Hi-E principle is illustrated by the curves on this chart. The low points of the two curves mark the boundaries of the high-efficiency range.

Broadest tooling line in the industry!

The complete quality line of Carboloy toolholders, inserts, insert seats, convertible seats, and brazed tooling is the broadest in the industry — designed to meet *every* tooling need!

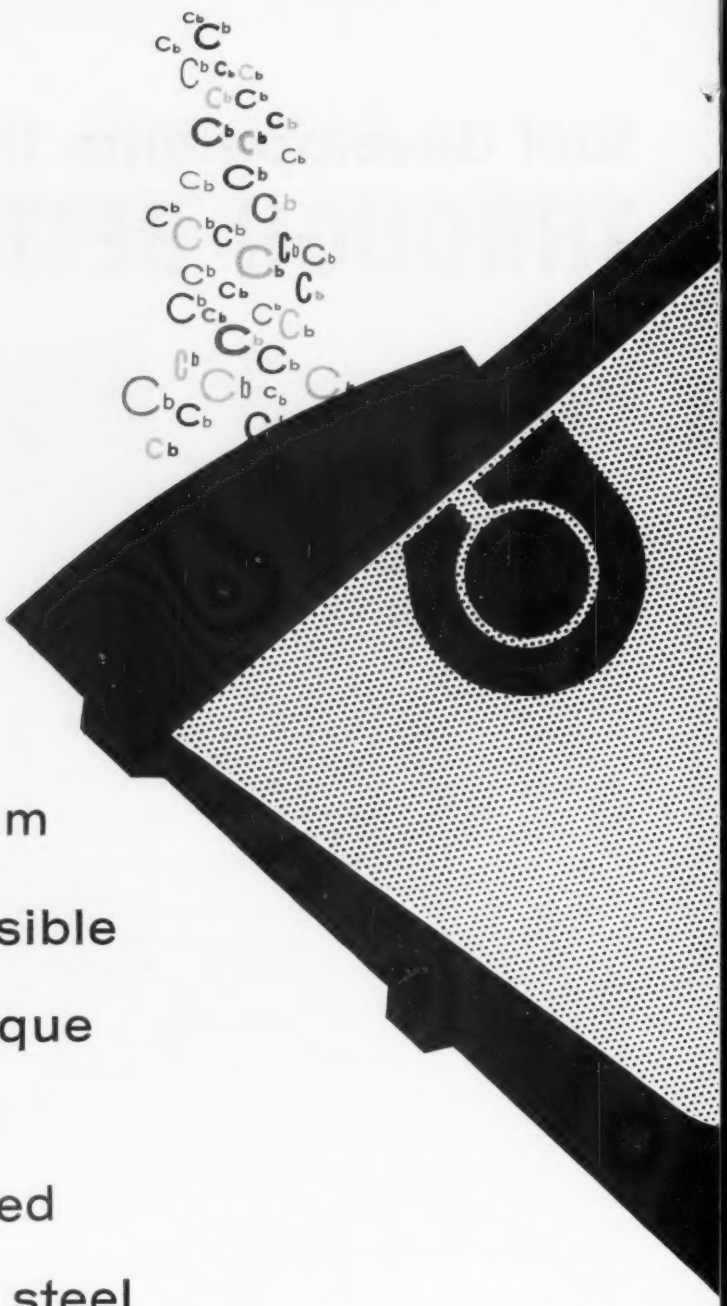
Make your goal better profits through better tooling! Check with your Authorized Carboloy Distributor. He's listed in the Yellow Pages. *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

CARBOLOY
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS



Columbium

makes possible

this unique

new

fine-grained

carbon steel

GLX-W

Compare fine-grained GLX-W with the steel you use

Great Lakes adds a precise amount of columbium to good-quality carbon steel. The result is fine-grained GLX-W steel. Here's how GLX-W compares with mild carbon steels . . .

- GLX-W is 50-100% stronger
- Has greater notch toughness
- Has excellent weldability
- Is as ductile as other carbon steels
- Permits designers to reduce weight up to 35%.

For proof on how GLX-W can cut your production costs, write, wire or phone Great Lakes Steel Corporation, Product Development Division, Department B-10.

GLX W

GREAT LAKES STEEL

Detroit 29, Michigan

A DIVISION OF NATIONAL STEEL CORPORATION

Load Handling is Easy— Safe with COFFING

Quik Lift
ELECTRIC HOISTS

It's easy for the operator to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The design of the pistol-grip control station and the combination strain and power cable makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

For Safety the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are mechanically interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety feature.

For Efficiency in load handling specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

DUFF-NORTON

- Pistol-Grip Push-Button Control
- Lightweight Aluminum Housing
- V-Type Brake for Maximum Braking Surface
- Easily Adjusted Limit Switch
- Complete Line of Accessories

RATCHET LEVER HOISTS

QUIK-LIFT AIR HOIST

CHAIN HOISTS

COFFING HOIST
DIVISION OF
DUFF-NORTON COMPANY
813 Walter Street • Danville, Illinois

New Trend In Steel Buying: Many profit-conscious manufacturers taking a long, hard look at steel buying policies; more and more of them cutting costs by purchasing more steel *as it's needed and ready for production* from modern Steel Service Centers.

"We've cut delivery time 75%"

says Mr. W. M. Croft, California Drop Forge Company, Los Angeles, California

"U. S. Steel Supply's prompt deliveries help us keep this drop forge hammer busy."

"Our normal delivery time used to be four or five weeks," says Mr. Croft. "Now, we offer 7-day delivery on orders, when necessary, because we're able to get the material we need from U. S. Steel Supply on an overnight basis.

"Recently, we faced this situation: One of our aircraft customers, through an accident, lost 65 parts from a 200-unit order; he notified us immediately, and we, in turn, called U. S. Steel Supply for the material. It arrived the next day, and a week later the re-order was completed. Our customer was impressed!"

Why not take a close look at *your* steel buying policies—you'll find U. S. Steel Supply's booklet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U. S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *steel.*

USS is a registered trademark

"On one day's notice, U. S. Steel Supply furnished us with 80,000 pounds of hot rolled bars," says Mr. J. F. Armitstead, Shop Superintendent.

U.S. Steel Supply Division of USS United States Steel

Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Memphis, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco. • General Offices: 208 South LaSalle Street, Chicago 4, Ill.

"Build us a plant,". . . we said, "to step up spring service to the mid-continent"

and here it is . . .

newest, most modern springmaking plant in the world

Ground broken in June . . . now beginning operation . . . this modern plant of our Gibson Division means improved quality, production efficiency and customer service — the prime objectives of Associated Spring Corporation. In the mid-continent region, for example, we now provide in addition to this plant, a new sales and engineering office in Chicago, plus expanded operations in the Milwaukee Division.

Here is further evidence of adapting to needs of industrial markets—already demonstrated in the strategic location of other Associated Spring Divisions and sales offices throughout the United States, Canada and Puerto Rico. It's also assurance of progress, stability, and responsibility that you expect from the leader in precision mechanical springs and small stampings.

5912

Associated Spring Corporation **General Offices: Bristol, Connecticut**

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Gibson Division, Mattoon, Ill.
Chicago Sales Office, Chicago, Ill.
Milwaukee Division, Milwaukee, Wis.
Ohio Division, Dayton, Ohio
Raymond Manufacturing Division, Corry, Penna.
Cleveland Sales Office, Cleveland, Ohio
Seaboard Pacific Division, Gardena, Calif.
San Francisco Sales Office, Saratoga, Calif.
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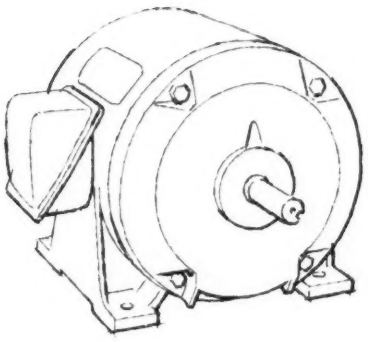
Subsidiaries—Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que.
Associated Spring of Puerto Rico, Inc., Carolina, P.R.

William R. Clements, Director—Co-founder of Master Electric Division—and Edward E. Helm, President, Reliance Electric and Engineering Company.



"this is the new Duty Master A-c. Motor..

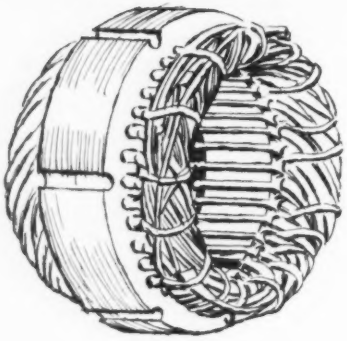
product of the combined engineering and manufacturing resources of two fine companies. It is completely new from core to cover. Its qualities of built-in protection and overall creative engineering makes it the finest line of motors ever built, from protected, open to totally-enclosed, explosion-proof. Our people are ready to give you the complete story. Sizes, 1 through 250 hp. are *in stock* at our distribution centers from coast to coast, ready to be delivered to your plant NOW." *Edward E. Helm*
William R. Clements

RELIANCE : MASTER

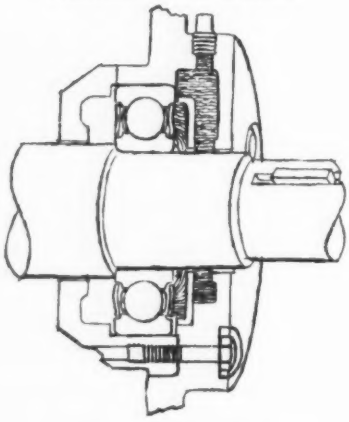
ELECTRIC AND ENGINEERING COMPANY : ELECTRIC COMPANY DIVISION

Earl C. Barnes, Chief Engineer

"the practical advantage of Duty Master is built-in protection.



PROTECTED WINDINGS



METERMATIC LUBRICATION

"The first important factor here is insulation. Using the latest and most effective materials, the complete, tightly-wound stator resists water, acid, dirt and other contaminating elements. Pre-heated dry windings are thoroughly impregnated with multiple dips and bakes in thermosetting varnish . . . and further protected with a finishing enamel. This adds years to motor life under critical environmental conditions.

"Secondly, Reliance's exclusive 'Metermatic' lubrication system regulates the flow of grease to the bearing as well as providing automatic grease relief. The pre-lubricated bearings have an extra large grease reservoir—eliminating many maintenance headaches. There's never any danger of under or over-lubrication.

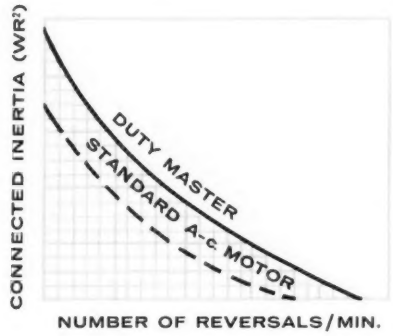
"These features, and many others, accomplish a major objective in creative engineering and design—to give a-c. motor users the best value in industry today." *Earl C. Barnes*

RELIANCE—R Duty Master A-C. MOTOR

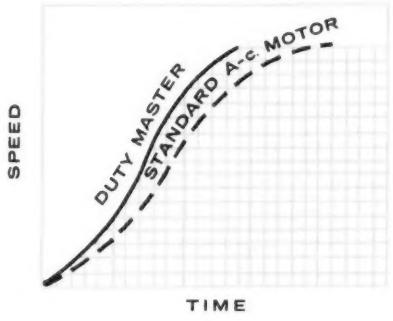
Dr. C. G. Veinott, Chief A-c. Design Engineer

"Duty Master's superior performance is the result of digital computor analysis.

REVERSAL



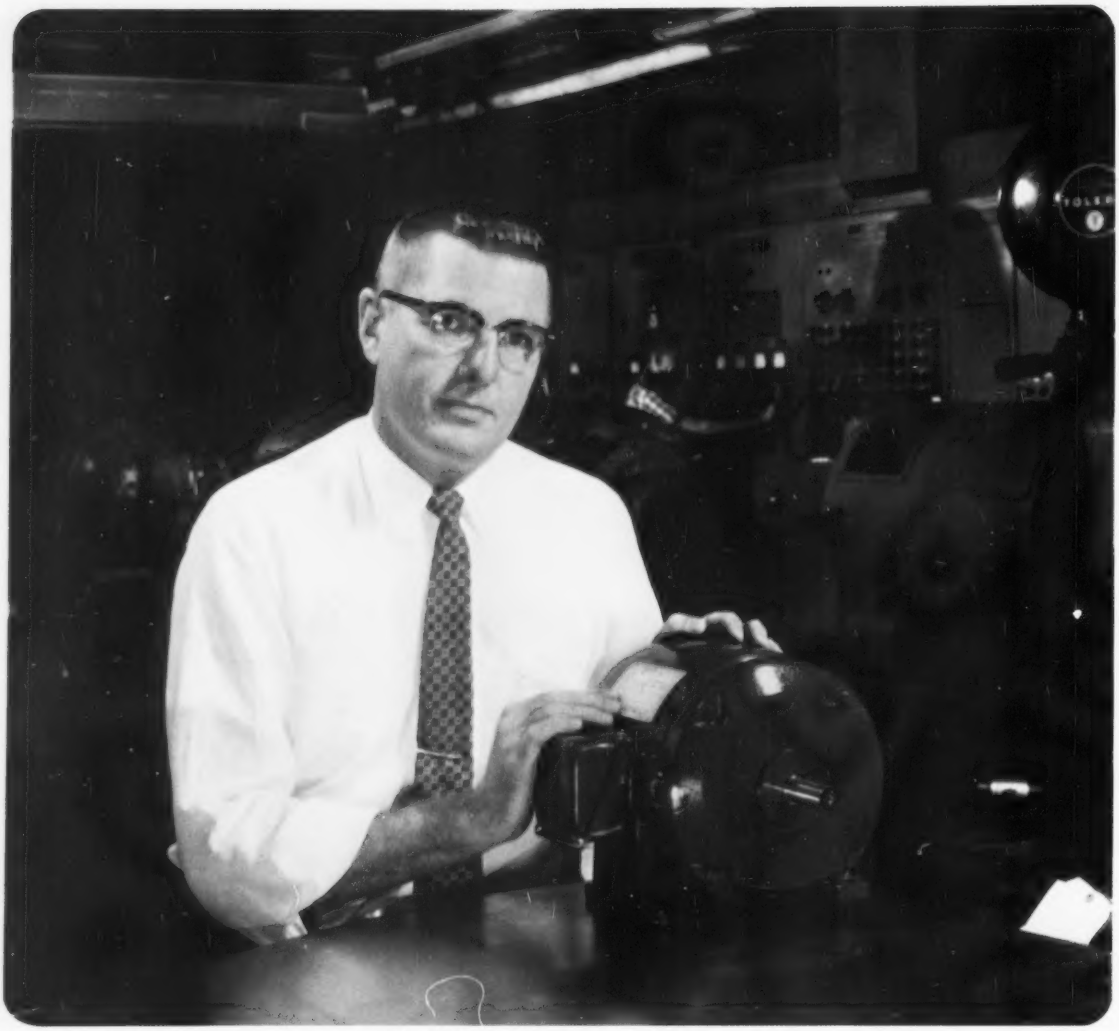
ACCELERATION



"Over 3000 designs were programmed and tested on these computers, leading to the evolution of the final electrical designs. The result of this intensive program is an extremely efficient a-c. machine. Electrical losses have been reduced to a new low point. We have taken advantage of new materials and techniques to develop a truly *new* motor, not just a face lifting.

"Typical of the many results of this design effort is the low inertia rotor with much improved starting, stopping and reversing characteristics. This new rotor, combined with better ventilation and increased accelerating torques permits frequent starts and stops without overheating. And this is only *one* specific example of design improvement. The new Duty Master incorporates *many* such improvements, more than meeting NEMA motor standards, making it the best all around motor available." *Dr. C. G. Veinott*

RELIANCE-R Duty Master
A-C. MOTOR



John Walker, Manufacturing Manager

"the modern equip—ment that produces Duty Master translates itself quickly into what a customer wants in a motor.

"Keeping well ahead in quality, production and deliveries has called for a substantial expenditure in new machinery in 1959. Automatic winders, continuous annealing furnaces, insulation system processes, tooling and turning equipment, welding, forming and handling equipment —all these things assure high quality components through advanced production methods. The result is an exceptionally good motor." *John Walker*

Let your Reliance Sales Engineer or distributor show you what we mean. He is the man with all the technical and application facts; and you can reach him through the Yellow Pages; or write for Bulletin No. B-2106, Reliance Electric and Engineering Company, 24701 Euclid Avenue, Cleveland 17, Ohio.

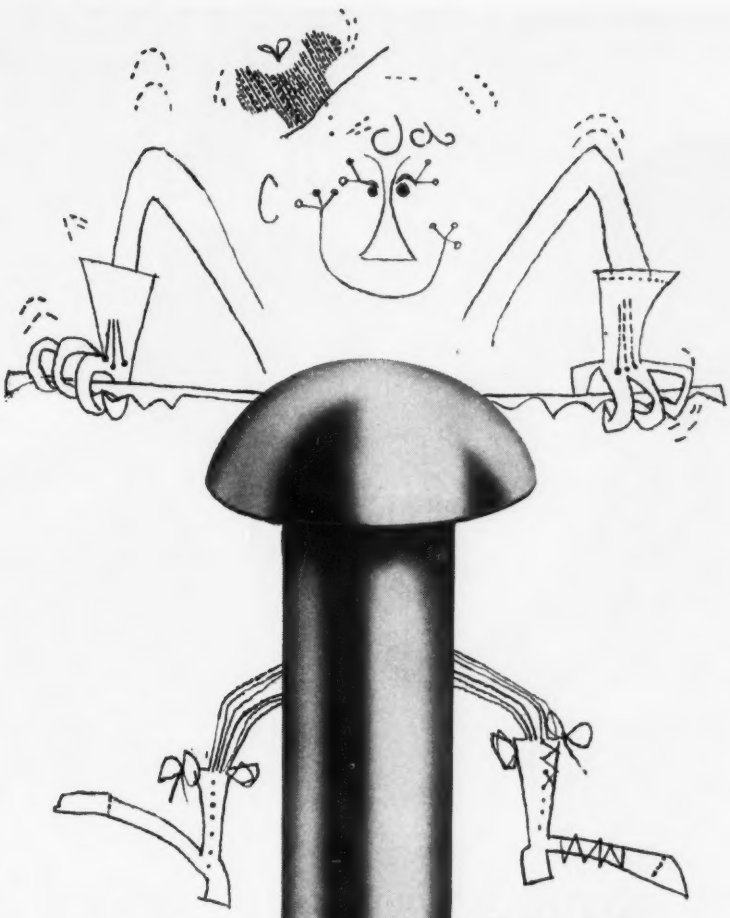
DUTY MASTER AVAILABLE FROM STOCK—NOW

RELIANCE ELECTRIC AND ENGINEERING CO.

CLEVELAND 17, OHIO
CANADIAN DIVISION: TORONTO, ONTARIO
Sales Offices and Distributors in Principal Cities

MASTER REEVES R

B-1623 Printed in U.S.A.



HAMMER DOWN PRODUCTION COSTS WITH ALCOA ALUMINUM RIVETS

When you fasten parts made of aluminum with Alcoa® Aluminum rivets, you gain three important advantages. You improve the quality and appearance of your product, reduce material cost and speed up production for added savings. Economical, easy to work with, Alcoa Aluminum rivets seat and fasten quickly and are correctly tempered for the specific job at hand.

Alcoa Aluminum rivets are produced with straight or chamfered shanks. Their bright, flawless finish adds extra selling power to aluminum products. Galvanic corrosion and staining become problems of the past.

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at Smith & Cross

. . . with the help of the Ætna Life's Business Planning Department

Arthur H. Smith and Robert Cross are partners in a machinery business. Their company has grown over the years and looks to a prosperous future. Both Smith and Cross are known as good businessmen. They are aware that when either of them dies the partnership, by law, ceases to exist. The surviving partner and the heirs of the deceased partner are left to pick up the pieces. Therefore, with the help of their Ætna Life representative, attorney and accountant, they set up a plan to assure continuation of the business and security for their own families. If you own or operate any kind of business, it will pay you to investigate the vital need for a business continuation plan — and no one is better equipped to serve your interests than the Business Planning Department of your local Ætna Life General Agency.

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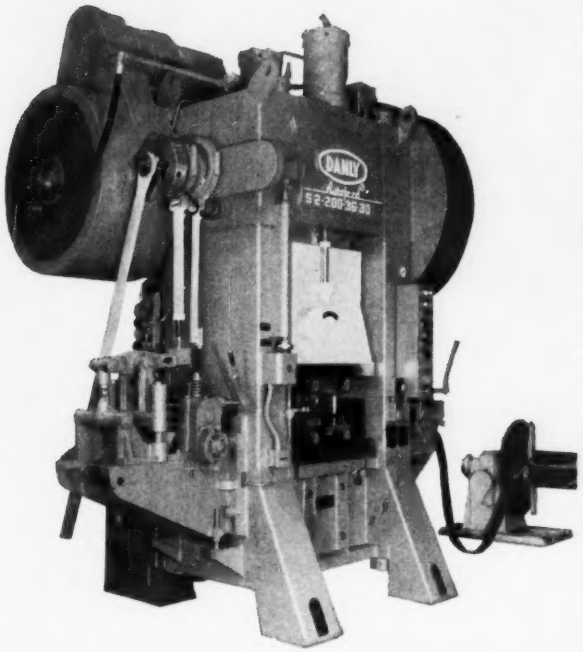
DANLY®

The Leading Supplier to the Stamping Industry

in PRESSES

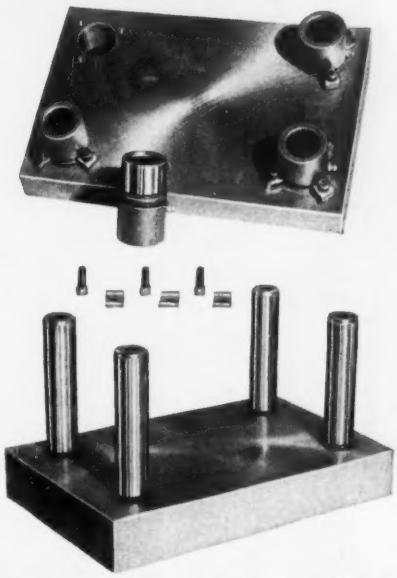


Look at the Nation's most modern stamping plants . . . see which press you find most frequently . . . you'll discover it's Danly! There are good reasons for this. You get lower operating costs with Danly Presses—you can depend upon it! The extra muscle and precision built into all Danly equipment means smoother die closure, less vibration, less die wear. Danly Presses reduce profit-eating maintenance and spare parts inventories . . . produce more accurate stampings, and more parts per shift.

There are many new developments you should know about, such as the Quick Die Change feature available on all Straight Side Presses . . . single, double and triple action . . . the modern high-production Autofeeds . . . and the completely modern line of Open Back Inclinable presses just introduced. See how Danly can help you reduce costs and give your products the stamp of leadership!

Write for the new Autofeed Catalog that gives full information on Danly Presses for high-production stampings.

in DIE SETS and Die Makers' Supplies



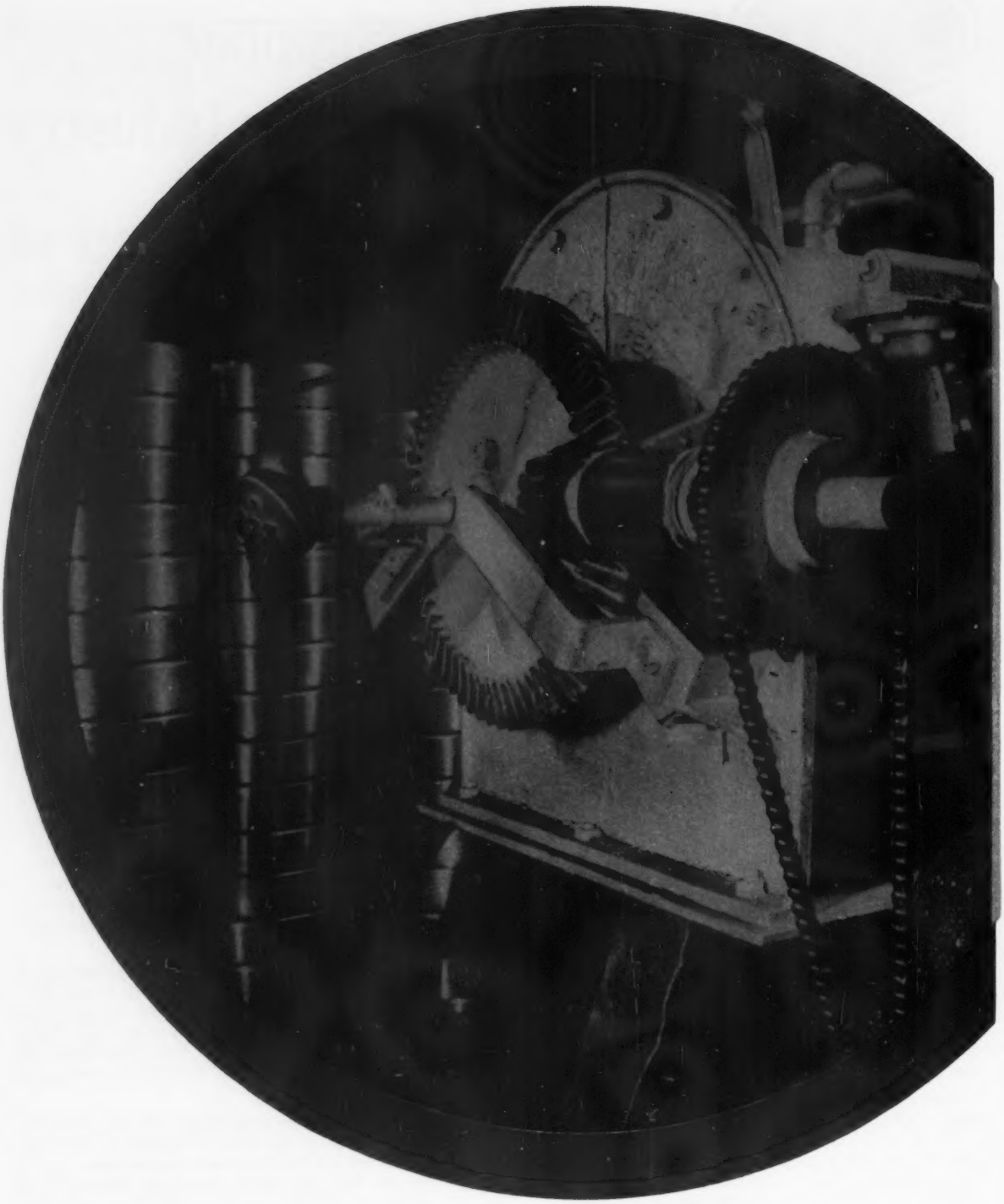
With the introduction of the Demountable Bushing Die Set, Danly is now working on its fifth million in die set production. Included in this production are die sets mounted in five Danly Autofeed Presses that produced a million pieces per grind with an average of 219,000 pieces per .001 inch of die grind.

In every instance, Danly can meet your most exacting diemaking specifications with a die set—standard or special. Since pioneering the first mass-produced precision die sets 36 years ago, Danly has continuously developed new production, inspection and distribution methods to serve you better.

Today, there's the new Danly Die Set with Demountable Bushings being assembled in a factory branch or distributor assembly plant near you. It is your fast, convenient source for toolroom and pressroom supplies that bear the stamp of leadership. Danly facilities for special Die Set manufacture are also improved and expanded .

Send for money-saving facts. Write us and your distributor or branch will give you helpful information on Danly Die Sets.

DANLY MACHINE SPECIALTIES, INC. DANLY® 2100 S. Laramie Avenue, Chicago 50, Illinois



High-temperature bearings, such as those in this rotary furnace, last longer, require less maintenance with Mobilplex EP.

Mobilplex ep

The Multi-Service Grease with unique Calcium EP Complex. Never before in a single lubricant such a wide range of use . . . such a margin of superiority . . . such a potential for maintenance savings.

Below: Infra-red heat lamp causes ordinary grease to run out of bearing. Mobilplex EP in bearing at left is unaffected.

Outstanding heat resistance is one of the many important properties of Mobil's new Multi-Service grease—*Mobilplex EP*. In your manufacturing plant you'll find it protects bearings operating at temperatures in the range of 300 F. Mobilplex EP also offers extra protection against wear under heavy loads, water emulsions and corrosion. It is a singularly tenacious and adhesive lubricant.

This Multi-Service grease has outstanding oxidation resistance as well as excellent structural and storage stability. These qualities—plus the great versatility of Mobilplex EP—make it useful throughout the plant.

Plant operators throughout the country are finding Mobilplex EP extremely effective in extending bearing life and protecting production schedules. In addition, they're saving more than with ordinary multi-purpose greases because Mobilplex EP makes it possible to reduce application frequency, simplify storage and handling procedures.

Contact your Mobil representative for full details. He can show you results of laboratory performance tests of Mobilplex EP and five leading competitive extreme-pressure greases. You'll see why Mobilplex EP is rated tops!

MULTI-SERVICE ABILITY OF MOBILPLEX EP

ANTI-FRICTION BEARINGS. (*horizontal and vertical*). Temperatures in the range of 300 F. Heavy or shock loads. Water contamination. Speeds—low, normal, high.

PLAIN BEARINGS. All normal mechanical and operating conditions. Temperatures in the range of 300 F. Waterwash. Heavy or shock loads.

DISPENSING AND APPLICATION DEVICES
Transfer pumps. Hand and power guns (*long lines*). Central greasing systems.

Mobil

ESCO CENTRIFUGAL CASTINGS KEEP

MACH 17 IN A TUBE!

Tremendous pressures and temperatures are generated in this shock tube at Lockheed Aircraft Corp., to simulate conditions encountered by a long-range ballistic missile re-entering the earth's atmosphere. High pressure gas triggers shock waves which travel 17 times the speed of sound. Instantaneous temperatures range above 15,000 degrees F.

The 44-foot long tube is an assembly of *ESCO* heavy-wall Spuncast® castings hydrostatically tested at 10,000 PSI. It is typical of the many exacting casting jobs that wind up at *ESCO*.

Simplify your design problems by calling *ESCO* for special alloy steel Spuncast pipe, standard heavy wall fittings, and special design fittings and valves.

ESCO®

ELECTRIC STEEL FOUNDRY COMPANY

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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
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IN CANADA ESCO LIMITED

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PACKAGING IDEAS FOR YOU

More efficient, more economical packaging in corrugated may be waiting for you — just off the beaten path. You have a better chance of finding it when you travel with Gaylord, trail blazer of the packaging industry.

When you need regular corrugated containers . . . or corrugated to replace heavier, more costly materials . . . or unusual corrugated packaging for unusual needs, it costs you no more to work with your G-Man.* He always has his eagle eye on new frontiers.

*Your Gaylord Man—of course

GAYLORD

CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

USERS OF **NEW**
ROEBLING HERRINGBONE* WIRE ROPE
HOLD THESE TRUTHS TO BE SELF-EVIDENT...

That Herringbone is the most practical and *needed* wire rope development to come along in years.

Herringbone, the regular lay and Lang lay rope, is actually two-ropes-in-one rope. Thus, the qualities that make these two ropes *good* ropes, combine to make Herringbone *excellent.*

HERE'S WHY:

The steel core of Herringbone provides the *ideal* support for the two pairs of Lang lay and one pair of regular lay strands used in its construction. In addition, the outer wires are heavier for extra abrasion resistance, and good flexibility is maintained by the finer wires inside. This combination of features enables Herringbone to give *longer service* in most applications.

Herringbone has been used on a wide variety of excavating equipment and tough hoisting jobs with impressive results. Its applications are practically unlimited on installations which call for all-steel ropes and on many where fiber core ropes are now being used. Another of Herringbone's added attractions is the fact that it eliminates the necessity for stocking Lang lay rope for one job and regular lay for another.

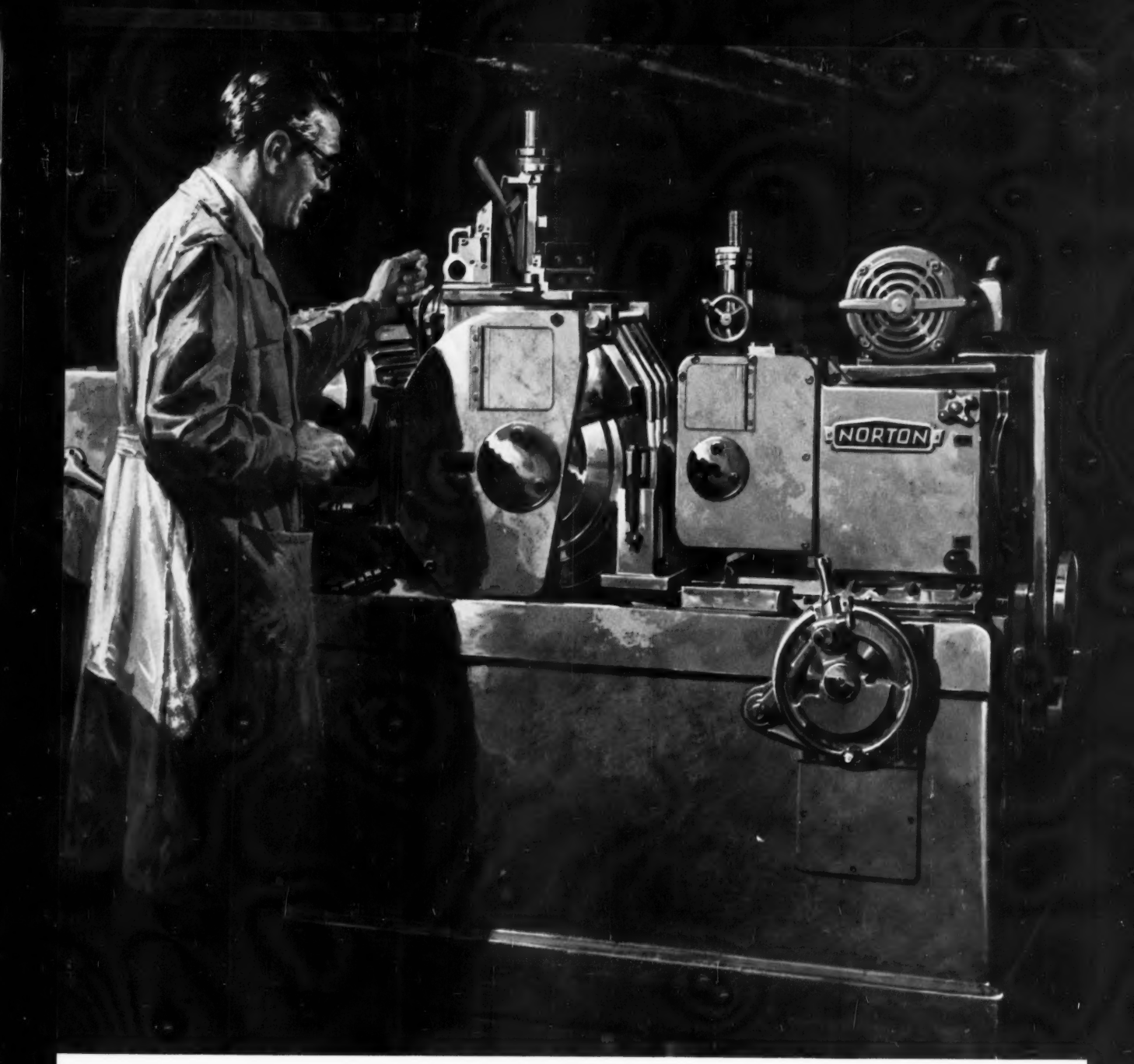
Your Roebling Distributor has Herringbone right now. He has, also, copies of a brochure describing Herringbone, the newest Roebling Star Performer. If you wish, write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, for literature and anything you'd like to know about Herringbone.

*Reg. App. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

HERRINGBONE
WIRE ROPE



Now you can add the "Touch of Gold" . . . with the new Norton centerless grinder

The ability to produce better products at lower cost is an *extra* built into every Norton grinding machine.

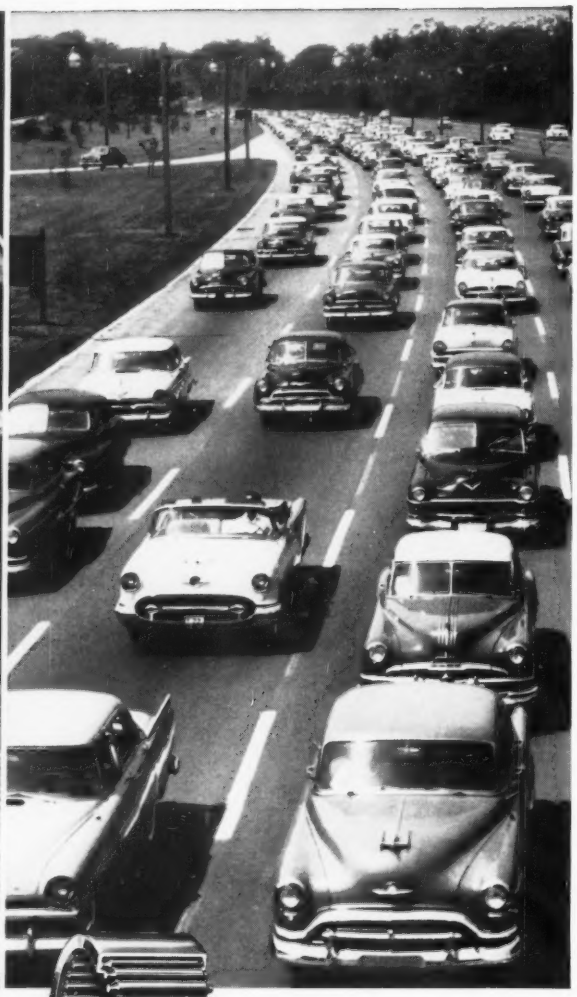
Now, for the first time, this "Touch of Gold" performance is available in a centerless grinder. The new Norton No. 2 Centerless Grinder, the latest addition to the world's largest line of grinders and lappers, is ready for immediate delivery.

How this sensational new grinder can help you get a new start against competition is worth knowing. Get the whole story from your Norton Man, soon. NORTON COMPANY, Machine Division, Worcester 6, Mass.

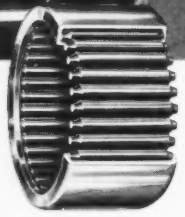
NORTON
GRINDERS and LAPPERS

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



from drilling rigs...



to automobiles

Torrington makes the right anti-friction bearing for every basic need!

In the oil fields where your gasoline originates, the need may be for a special Torrington Angular Contact Rotary Table Bearing to support thousands of feet of whirling drill string. In your car, it may be a compact Torrington Needle Bearing to smooth your steering.

Between these two examples lie all kinds of requirements. To meet this broad range of needs, Torrington makes every basic type of anti-friction bearing.

You can be confident that engineering recommendations from Torrington will bring the broadest experience to bear on your specific application requirements. For help in developing the *right* anti-friction application for your product, rely on your Torrington representative. **The Torrington Company, Torrington, Conn. —and South Bend 21, Ind.**

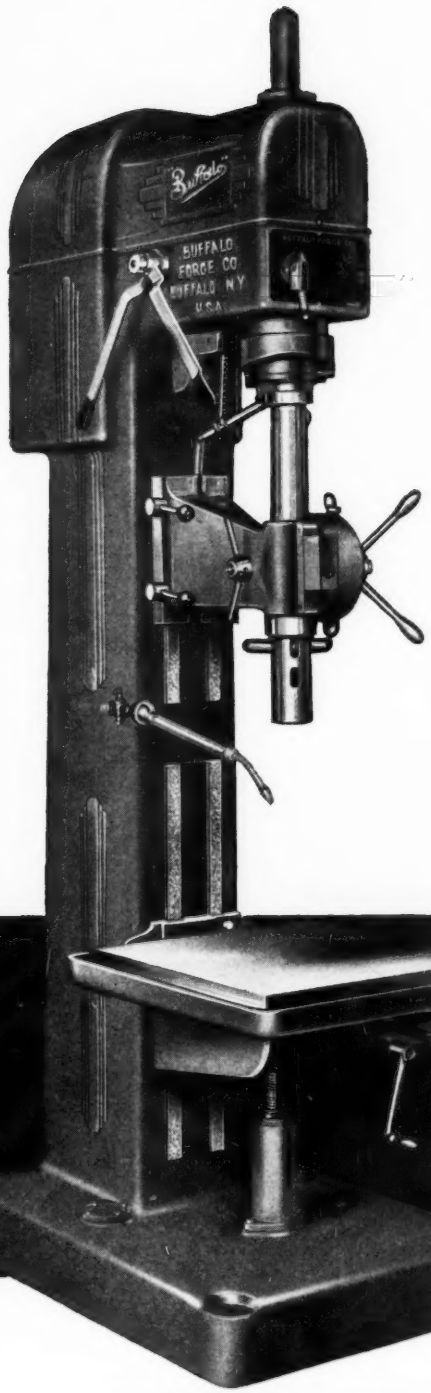
TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

NEEDLE SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • BALL • NEEDLE ROLLERS • THRUST

NEW

"Buffalo" No. 3A R-P-Mster with 2" Capacity and Torque-controlled Feed!

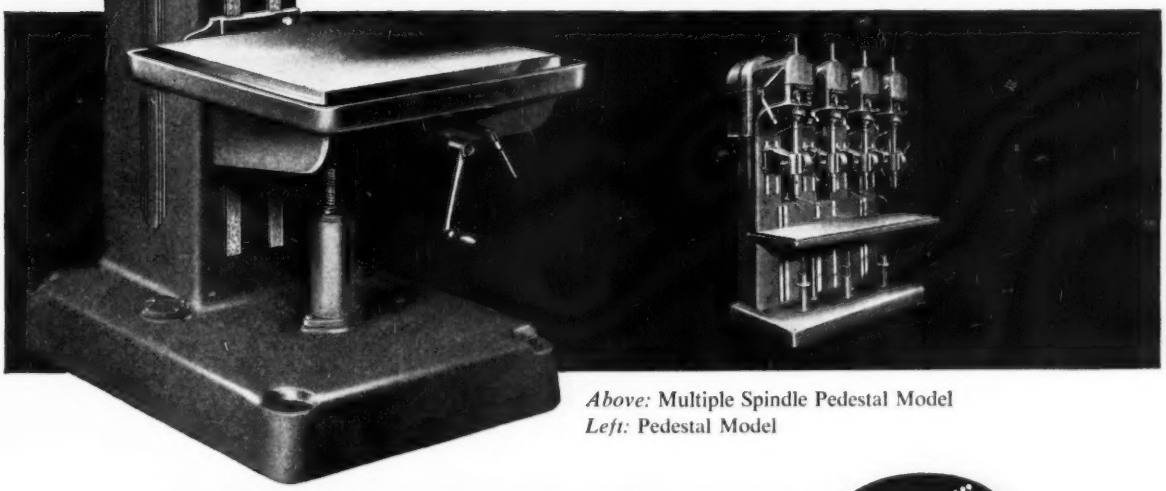


Welcome news for metalworking men! The new "Buffalo" No. 3A R-P-Mster brings you a rated capacity of 2" in mild steel.

Equally important is the exclusive "Buffalo" Torque-controlled Power Feed. With it you can safely use maximum speed and feed for the size hole being drilled. No need to worry about damage to drill or machine gearing. Danger of overloading the machine is positively eliminated by the torque control on the feed shaft.

Moderate price makes the new "Buffalo" No. 3A R-P-Mster your best variable speed drilling machine buy. All the other famous R-P-Mster features are retained — "1001" speeds, easily and quickly changed — extreme accuracy, smoothness, quietness and ease of drilling — rugged construction for long life with a minimum of maintenance. Available in 1 to 6 spindle models.

Only when you operate it yourself will you really appreciate these advantages of the "Buffalo" No. 3A R-P-Mster. Discover today how it can cut your drilling costs, increase production. Phone your "Buffalo" machine tool dealer for a demonstration, or write direct for Bulletin 3257-C.

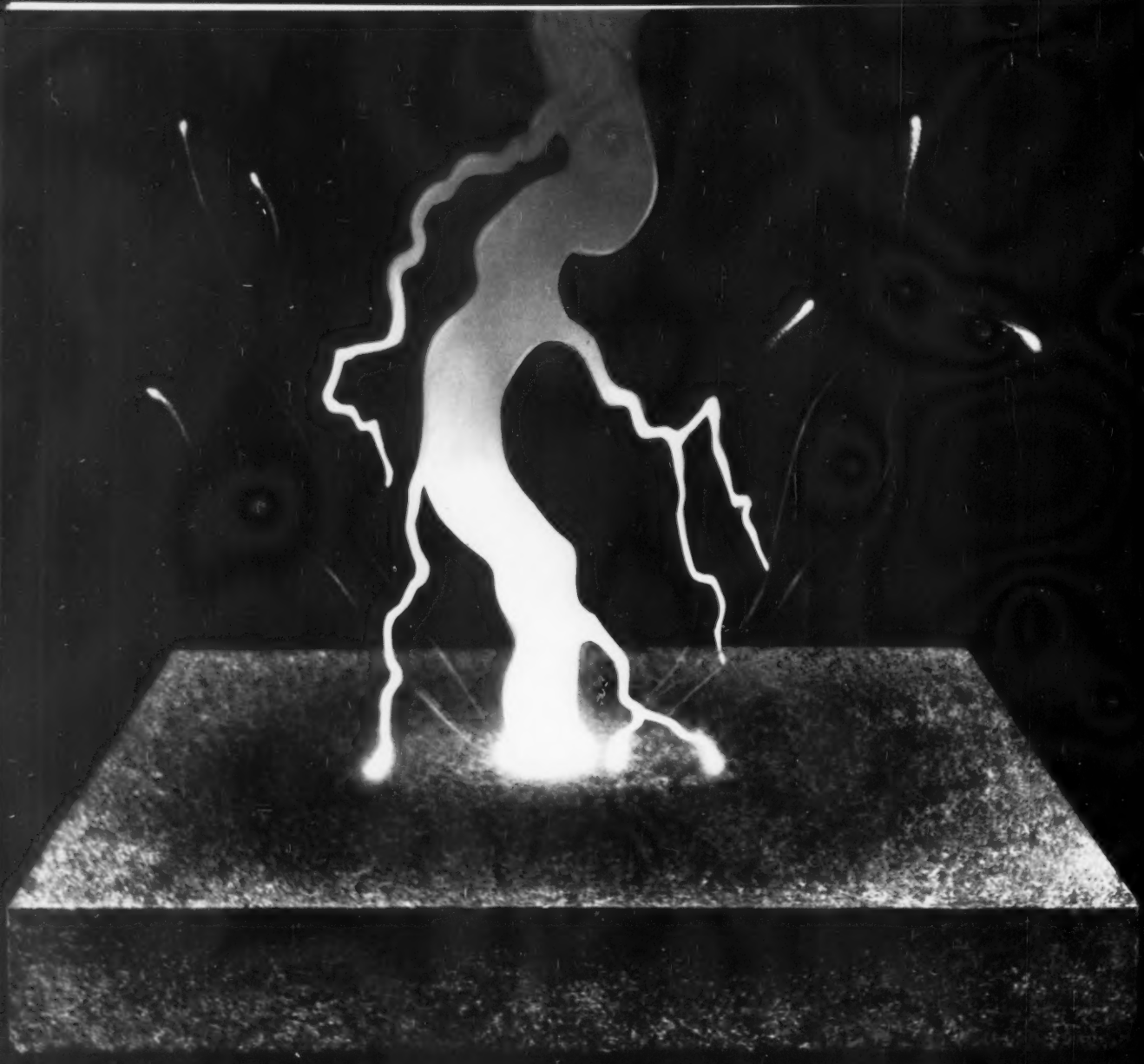


Above: Multiple Spindle Pedestal Model
Left: Pedestal Model

BUFFALO FORGE COMPANY
158 MORTIMER STREET BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

DRILLING • PUNCHING • SHEARING • BENDING



High voltage "lightning" discharge at a Malleable test block.

Toughness is Malleable

Under the slamming, bruising strain of a bulldozer's roughshod ride . . . inside the battering air hammer . . . against the repetitive concussion of a machine gun's smashing action . . . wherever conditions are really brutal, Malleable iron castings prove their ruggedness.

When you're looking for toughness, it will pay you to investigate Malleable castings. Contact one of the progressive firms that displays this symbol—

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

MEMBER
MALLEABLE
CASTINGS COUNCIL

New Malleable Irons Meet Gruelling Service Tests

Toughness is a vital requirement in stressed parts. Each application, however, requires a particular combination of physical characteristics to be sufficiently "tough."

Whatever the specific requirements, one of the finest groups of materials available is the Malleable irons, as illustrated in the tables below.

Tensile Properties—A.S.T.M. Minimum Specifications
Standard and Pearlitic Malleable Irons

Designation	Tensile Strength p.s.i.	Yield Strength p.s.i.	Elongation % in 2 in.	Designation	Tensile Strength p.s.i.	Yield Strength p.s.i.	Elongation % in 2 in.
Standard				53004	80,000	53,000	4
35018	53,000	35,000	18	60003	80,000	60,000	3
32510	50,000	32,500	10	80002	100,000	80,000	2
Pearlitic							
45010	65,000	45,000	10				
45007	68,000	45,000	7				
48004	70,000	48,000	4				
50007	75,000	50,000	7				

Strengths up to 135,000 p.s.i. tensile and 110,000 p.s.i. yield are produced commercially under individual producers' specifications.

Other Mechanical Properties
Standard and Pearlitic Malleable Irons

	Standard	*Pearlitic*
Modulus of Elasticity in Tension, p.s.i.	25,000,000	26,000,000—28,000,000
Ratio of Fatigue Strength to Tensile Strength	0.54	0.40—0.50
Shear Strength—% of Tensile Strength	80—90%	70—85%
Torsional Strength	Approximately equal to Tensile Strength	
Compressive Strength, p.s.i.	200,000	250,000

Malleable's toughness is illustrated in a severe test conducted by a manufacturer of cab-over-engine trucks. To be absolutely sure of the strength and toughness of a variety of components in the cab, including the critical Malleable iron cab support hinges, a truck was crashed at high speed into a barricade of ice. Result—no hinge damage, even though the truck was seriously battered.

Service-Demonstrated Toughness

Highway railing posts demonstrate Malleable castings' use where impact resistance is critical. As an example, thousands of Malleable railing posts line the Connecticut State Thruway. The State Highway Department reports that there have been no failures of the Malleable iron posts although other materials have failed in several cases.

It is also because of Malleable's toughness that so many of the highest quality hand tools are made of Malleable iron. One leading tool manufacturer tests the quality of its pipe wrenches by using a trick well known as the best way to break a wrench. The wrench jaws are put on a rigid bar, a long pipe is slipped on the handle, and the tester heaves his weight downward on the pipe. Because of their confidence in Malleable's toughness, this company unconditionally guarantees every Malleable wrench housing against distortion and breakage. Another hardware manufacturer makes a similar guarantee against breakage on its line of Malleable vises.

But Malleable iron's proven performance in field service is only one reason for its wide use. To this, you must add Malleable's low first cost, design flexibility, and excellent machinability. This combination offers unique advantages over other metals.

Design and Production Assistance Available

To assist in the use of Malleable castings, a special bulletin on toughness—Data Unit No. 105—is available from the Malleable Castings Council, Union Commerce Building, Cleveland 14, O. These bulletins and engineering and planning assistance are also readily available to you from any member of the Malleable Castings Council.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
National Mall. & Steel Castings Co., Indianapolis 22
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

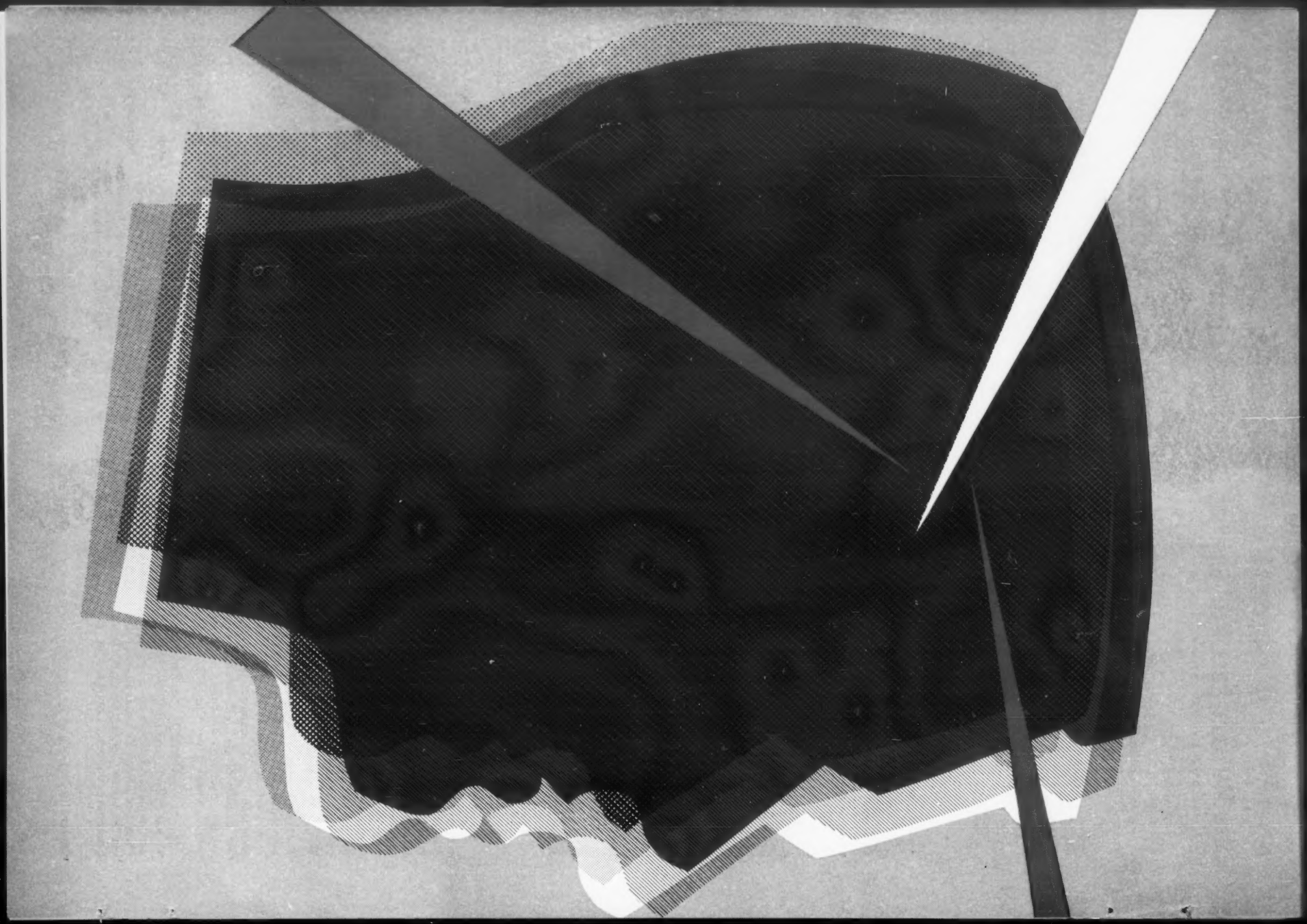
OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46



are you shock-proof?

Ever sit in a traffic-trapped taxi for an hour . . . only to find your destination was just around the corner? Ever build a patio . . . only to find a contractor would have done it for less than the cost of your materials? Ever sweat six months over a problem on the job . . . only to find the solution had been available by picking up the phone?

Carpenter can't shock-proof you from everything, but we *can* help you with the application of electronic, magnetic and electrical alloys. No matter how difficult your problem, there's an excellent chance that our continuing research and development program has already produced information to save you time and money.

In addition to leading the field in technical assistance to industry, *Carpenter* also provides the convenience and reliability of one-source supply. You name it—dimensional control, resistance control, magnetic control—*Carpenter* offers the world's widest range of alloys to meet your most critical needs.

Carpenter alloys provide easy, fast fabrication, such as blanking, edge-winding, spot-welding and machining. And you waste no time experimenting to find the proper heat treating methods and temperatures. Highly specialized as these alloys are, *Carpenter* has "standardized" their properties to minimize problems from design to delivery.

Why not check *Carpenter now* . . . instead of later?

tool and die steels
stainless steels
electronic, magnetic and electrical alloys
high temperature alloys
special-purpose steels
tubing and pipe
fine wire specialties

***Carpenter* steel**

a new company 70 years old

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

Charging-Box Cars . . .

built to last by a company that uses them!

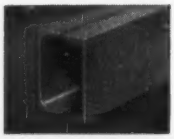
5 unique structural features make them better

Charging-box cars have to take a lot of punishment. And, in the 36 years we have been making charging-box cars for our own use, United States Steel has developed several features in structural design that assure longer life, less maintenance, and dependable service.

As illustrated in the typical four-box car shown here, the advantages of these design features—plus the rugged durability of all-welded *rolled* steel construction—make any size USS Charging-Box Car a profitable investment.

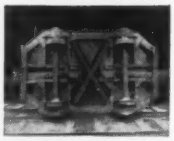
Our representatives will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. Meanwhile, write for our free illustrated booklet—*USS Custom Designed Cars*. United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark



Box girder construction: Two channel sections, welded toe-to-toe, provide a frame far stronger than the ordinary angle or channel frame. This box frame is used under both the sides and ends of the car.

Double center sills: *Two* channels, back to back, run the entire length of the car. All cross members are welded to these sills, providing superior longitudinal rigidity.



X-frame bracing: These cross braces tie the box girder frame and the center sills together for additional strength and rigidity.

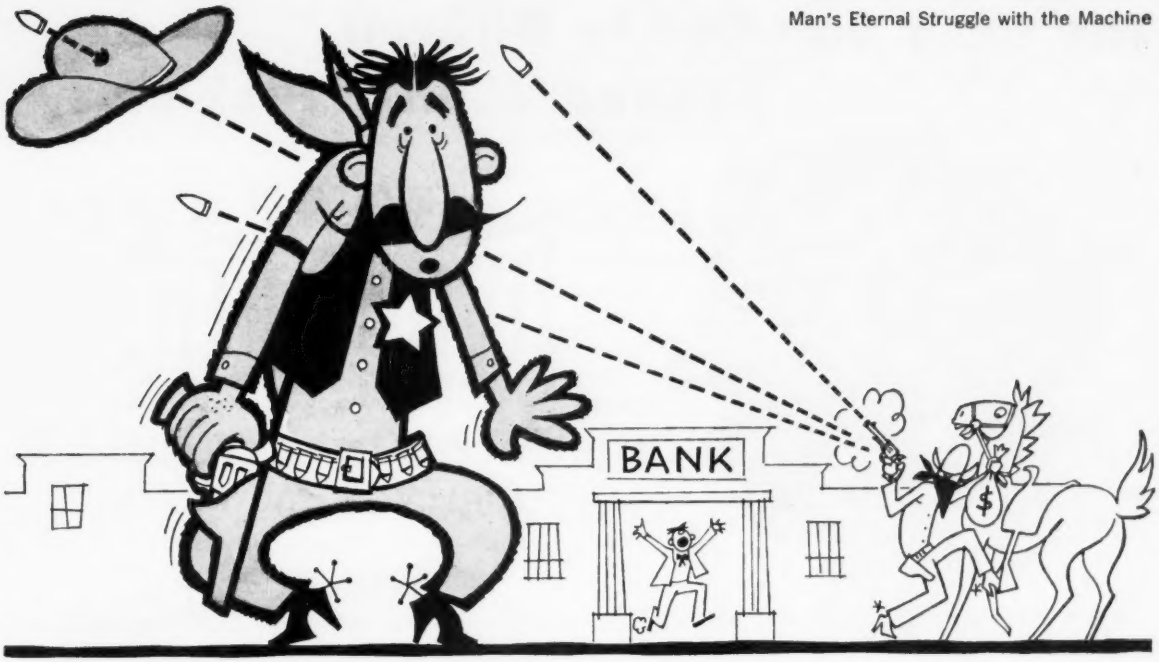
Spring pockets: Over each wheel, pockets are built into the bottom of the frame and "boxed in" on all sides. Coil springs are set into these pockets. This construction permits vertical, but no lateral, movement of the springs.

Long-shanked couplers: Pivot points of couplers are *behind* each axle. This permits turning the car on a short radius curve with less wheel flange pressure than with a short-shanked coupler.

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

Man's Eternal Struggle with the Machine



COMPETITIVE PRESSURES AND RISING COSTS DEMAND GREATER PRODUCTION EFFICIENCY THAN EVER BEFORE

Have you ever wished you worked in a nice, quiet little shop...?

Sure you have.

The chances are you don't work in one now. There just aren't any nice, quiet little shops anymore. Everybody's out to make a buck. And they all seem to be competitors of yours.

Like everybody else's, your shop is full of complex equipment. Production is rough on the best of it. Eventual breakdown of some sort is almost inevitable. Even though your maintenance people can satisfy most of the problems, what happens when something goes wrong they can't handle?

With your production held up by a breakdown, you can't afford a vendor who passes the buck for service to all the suppliers of his components!

And what about that new equipment you're going to buy? Probably the latest in design. Most likely something your service people don't know anything about at all! Yet, it's got to get into production fast, and stay in as consistently as possible. With your production waiting, you can't afford to test and prove the vendor's machine for him!

Sciaky has always accepted *full responsibility* for its resistance welding and production equipment. Sciaky equipment is designed and built to do the job it was sold to do. That's why it's tested and proved *before shipment.* That's why the Sciaky Service Organization is on call anytime to service Sciaky equipment when necessary.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you're considering equipment. No obligation, of course.

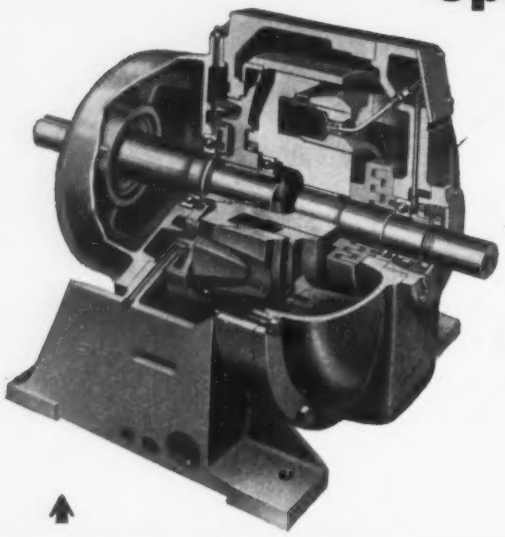
Sciaky Service is a plus-feature that has been wanted by customers all over the world. Why take a chance on service that's sometimes needed on even the best machines. Why, to be sure, when you can enjoy the service facility that has been the difference between expensive production stoppages and minor delays.

SCIAKY

75A

SCIAKY BROS., INC., 4909 W. 67th STREET, CHICAGO 38, ILLINOIS • POrtsmouth 7-5600

The BEST Solution to Difficult Speed Control Problems—

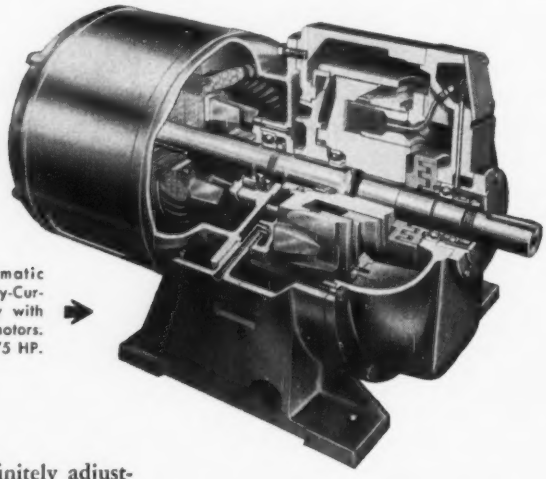


Dynamatic Liquid-Cooled Couplings provide infinitely adjustable speeds for nearly every application from 3 to 75 HP. Note the absence of slip rings, brushes, and commutators. Heavy-duty types with capacities up to 5,000 HP are also available.

EATON

DYNAMATIC®

LIQUID-COOLED EDDY-CURRENT COUPLINGS and DRIVES



"Dynaspede" Drives are Dynamatic Liquid-Cooled, Stationary-Field Eddy-Current Couplings mounted integrally with standard, D-flange, squirrel cage motors. Available in capacities from 3 to 75 HP.

Here's Why—

Dynamatic Liquid-Cooled Couplings and Drives provide infinitely adjustable speed from a constant speed source—or constant speed from a variable speed source. They operate on standard alternating current. Rotary power is transmitted through the coupling by an electromagnetic reaction between the driving and driven members of the unit—there is no mechanical contact of rotating members to cause wear and require adjustment or replacement.

A wide range of standard and special control features may be obtained from a remotely-mounted electronic control system. Infinite speed adjustment, constant speed control, on-off clutch control, torque limit, acceleration control, inching, and threading are a few of the many functions available. The addition of an eddy-current brake to standard couplings or drives provides smooth, cushioned stops and controlled deceleration.

Liquid-Cooled Dynamatic Couplings and Drives deliver more horsepower than other types of the same physical size, thus conserving space in a busy machine area. Efficient heat dissipation permits continued operation at low speeds, or stall with full load.

Completely enclosed, Dynamatic liquid-cooled units are protected from dust, dirt, and other atmospheric impurities. Dynamatic design involves no brushes or slip rings; there is no possibility of arcing. With simple modification these units can be made explosion-resistant for hazardous applications.

Infinitely Adjustable Speeds from AC Power

★

Full-Torque Starts

★

Wide Range of Control Functions

★

No Slip Rings, Brushes or Commutators

★

Completely Enclosed Design

★

Low-Cost Maintenance

Send for Our New Illustrated Bulletin.

EATON

DYNAMATIC DIVISION

MANUFACTURING COMPANY

3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

LET'S TALK WIRE!

These lock washers are typical of many types and sizes of lock washers made from PAGE wire—and lock washers are just one of the many end products for which PAGE manufacturers wire is a logical choice.

Regardless of your use of wire, you can count on PAGE uniformity. Whether you make hairpins or lock washers, PAGE wire will give you the tensile strength, ductility, finish, tolerance and other properties you require.

PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902, we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO *Aluminized* Wire—commercially pure aluminum bonded to a steel core.

Why not put PAGE experience and knowledge to work for you to improve your product and lower your costs.

ACCO

PAGE MANUFACTURERS WIRE

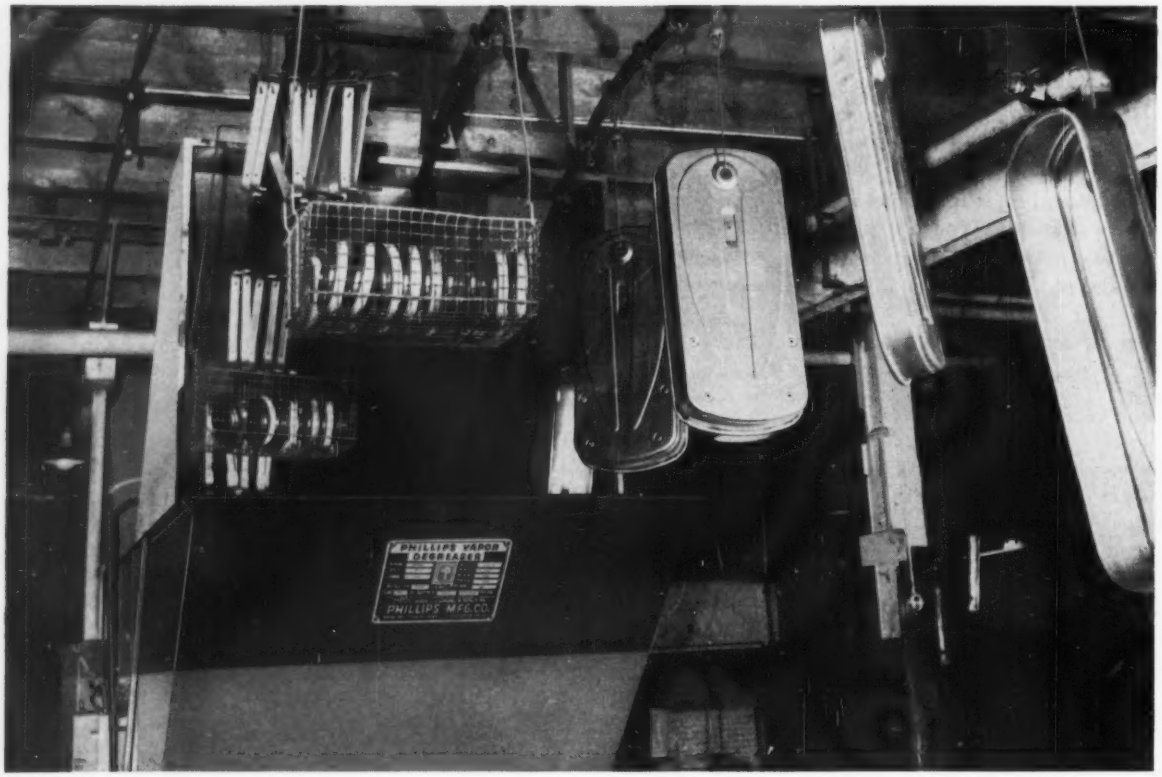
Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

PAGE —the source for answers to wire problems

Vapor degreasing-

we can show you how to save more money, get better cleaning results with the right degreasing cycle



This monorail conveyor-type Phillips degreaser provides high-speed cleaning without interrupting the production line. Work travels through the degreaser, drying as it comes out and proceeding to the next station.

Vapor degreasing with Diamond Perchlorethylene digs out soils other methods can't touch. Handles all part sizes and weights. Requires less space, effort and maintenance. It's safe, fast, flexible . . . and work comes out stain-free, etch-free, warm and dry.

But *your* cleaning operation calls for its own degreasing cycle. And that's where DIAMOND PERCHLORETHYLENE comes in.

We'll test-clean a sample for you! Diamond Solvent Specialists will analyze your cleaning problems and help you select the sample for test cleaning. Then they'll give you a full report on the cycle that's most efficient for you and saves you the most money.

So ask for DIAMOND TECHNICAL SERVICE *now*. For information, write DIAMOND ALKALI CO., 300 Union Commerce Bldg., Cleveland 14, O.

Diamond Chemicals

BORG-WARNER SALUTES ITS **Ingersoll** DIVISIONS

The first Ingersoll plant, at Sandoval, Illinois
as it appeared in 1899

1884 1959

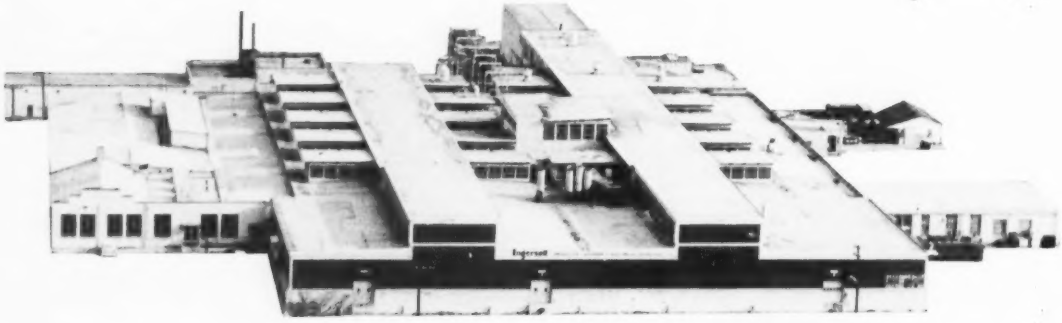
On Their 75th Anniversary

BORG-WARNER CORPORATION

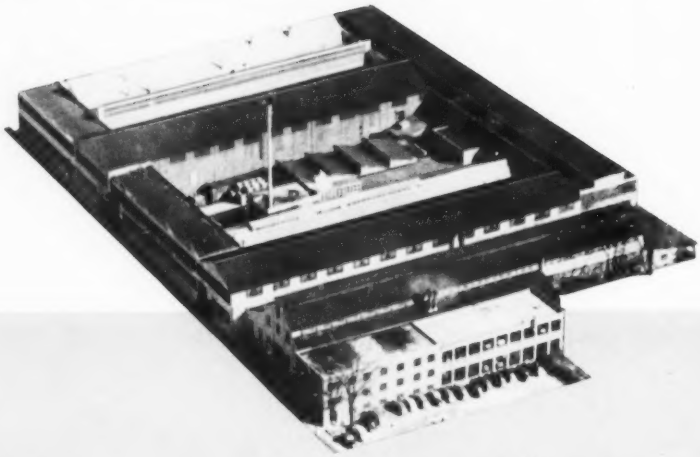
ENGINEERING B-W PRODUCTION

Ingersoll *Kalamazoo Division*

1884 75 YEARS 1959



The extensive engineering and production facilities of Ingersoll Kalamazoo Division are located at Kalamazoo, Michigan. North Plant, above; Vine Street Plant, at right.



In 1884, with a handful of employees and a small factory, Stephen A. Ingersoll founded the company that today includes four separate Borg-Warner Divisions, and the management and operation of a B-W subsidiary.

During these 75 years the Ingersoll employee force has grown to several thousand; manufacturing facilities have expanded to seven modern plants with approximately 2,000,000 square feet of space; and extensive product diversification now serves many industries.

Ingersoll Kalamazoo Division had its origin in 1937 when Borg-Warner acquired the facilities of the U. S. Pressed Steel Company. Originally producing automotive stampings, the Division has for many years served the Navy and Marine Corps as design agent, prototype development and test activity, central procurement agent, and lead construction yard for the production of LVT amphibious assault vehicles.

In addition, Ingersoll Kalamazoo today produces rocket motor cases and boosters for the nation's guided missile program; the "Load Lugger," "Huge Haul" and other materials handling products; and a new type military amphibious vehicle designed, developed and engineered by Ingersoll for the Army Transportation Corps.

Back of all these products is the continuing Borg-Warner aim: "Design it better—make it better"—a tradition that benefits almost every American every day.

DESIGN IT BETTER INGERSOLL KALAMAZOO® B-W BORG-WARNER *MAKE IT BETTER*

Rocket Motor Cases have been produced by Ingersoll Kalamazoo for many years. The four boosters and sustainer motor case of the Nike Hercules Missile are produced for the Army.

A product of Ingersoll Kalamazoo Division, the Load Lugger System of materials handling consists of detachable steel containers handled by a truck equipped with Load Lugger hoist. Loaded container is picked up, placed on truck bed, and transported to destination. With special containers, the Load Lugger handles all types of materials—solids, liquids or gases.

Similar in principle to the Load Lugger, Ingersoll's Huge Haul handles large quantities of waste, scrap, other bulk materials. Hoist capacity is 30,000 lbs.; containers handle up to 40 cu. yds.

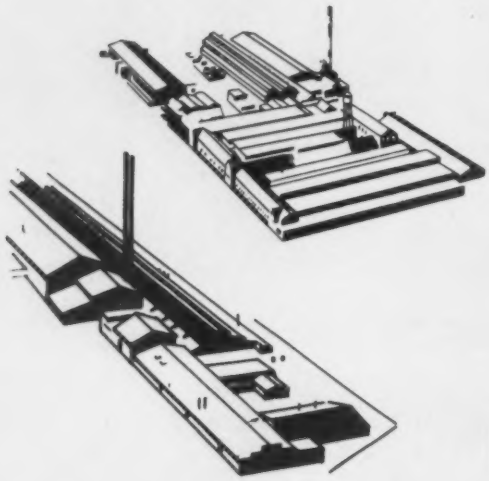
The LARC-5 is a new type military amphibious craft designed, engineered and built by Ingersoll Kalamazoo for the Army Transportation Corps. Carrying a 5-ton cargo, it travels through the water at 10 miles per hour, on land at 25 miles per hour.

A powerful landing or combat weapon, the LVT was designed and developed by Ingersoll Kalamazoo for the Marine Corps. It has been made in two forms—as an amphibious combat tank, and as a personnel and cargo carrier.

The Challenge . . . *and the Promise*

Recognizing that the achievements of the past are but a guide to the future, the Ingersoll Divisions of Borg-Warner reaffirm their continued adherence to the principles established by their founder—integrity of purpose, quality of product, and dedicated service. This is the Ingersoll challenge . . . and the Ingersoll promise.

THESE ARE THE INGERSOLL DIVISIONS OF BORG-WARNER



INGERSOLL PRODUCTS, Chicago, Illinois. Plow and harrow discs and coulter blades, pressed steel implement wheels, tractor seats and instrument panels, and other farm implement parts; tapered discs for truck wheels; formed and deep drawn steel stampings; raw and porcelain enameled washing machine tubs and components; porcelain enameled steel sinks and bathtubs; solid fuel furnaces; industrial cranes and hoists.

INGERSOLL STEEL, New Castle, Indiana. Open hearth and electric furnace high carbon and alloy steels; soft center plow steels; stainless and heat-resisting steels; stainless-clad steel sheets; forging quality electric furnace alloy steel ingots; high speed hack saw steels; agricultural flat and formed discs; automotive and tractor clutch discs; hand shovels, spades and scoops; lightweight aluminum scoops; stainless steel shovels and scoops.

INGERSOLL KALAMAZOO, Kalamazoo, Michigan. Materials handling equipment (Load Lugger System); special vehicles for the military; rocket motor cases and guided missile boosters; design agents for LVT amphibian landing vehicles.

REFLECTAL CORPORATION, Chicago, Illinois. (Ingersoll managed). Alfol aluminum foil reflective insulation for buildings; asbestos insulation; jacketing; KoolShade sun screen; Betocel cellular insulating concrete.

INGERSOLL-HUMPHRYES, Mansfield, Ohio. Enameled cast iron and steel bathtubs, sinks and lavatories; vitreous china water closets and lavatories; plumbing fixture fittings.

DESIGN IT BETTER B-W *MAKE IT BETTER*

BORG-WARNER®

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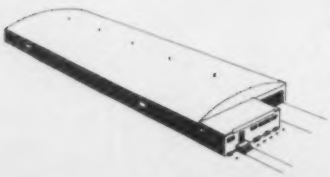

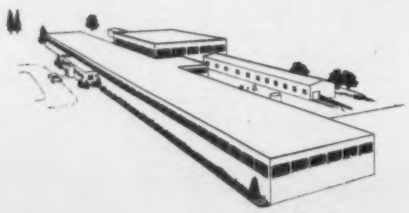

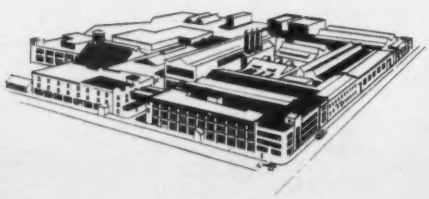

This is THERMAL FATIGUE

This photograph shows a heat-resistant alloy casting after thermal-fatigue failure.

Thermal fatigue begins with cyclical heating and cooling which produces alternate expansion and contraction. The shape of the casting hinders this expansion and contraction. As a result, hindered expansion and contraction stresses develop and increase until plastic flow occurs. This plastic flow produces a network of thermal-fatigue cracks and this cracking leads to failure.

Thermal fatigue is an inherent problem in heat-resistant castings. As such, it occupies an important place in Electro-Alloys research efforts to lengthen life of components working under high temperatures and severe cyclical conditions.

We have created apparatus that assesses and analyzes the variables of thermal fatigue. Check with your Electro-Alloys representative for the meaning of our thermal fatigue data as it pertains to the material, design and service conditions of your heat-resistant castings.

View and discuss Thermal Fatigue at the Electro-Alloys Booth, 727, National Metals Exposition, International Amphitheatre, Chicago, November 2-6.

Send for free technical booklet on Thermal Fatigue

Please send me free copy of "The Mechanism of Thermal Fatigue," by Howard S. Avery—comprehensive report based on extensive lab studies:

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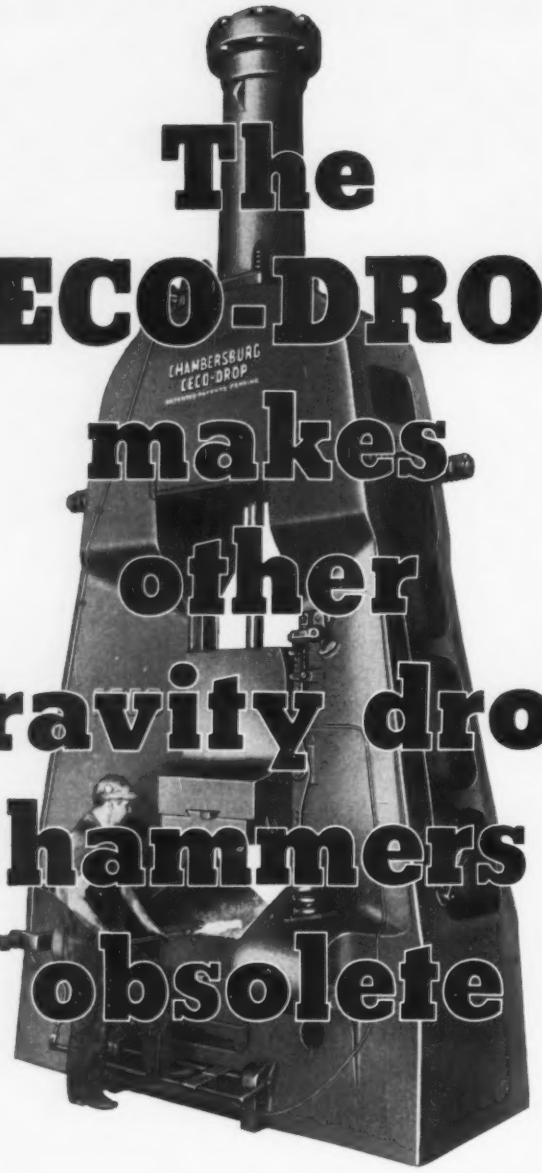
Electro-Alloys, 10210 Taylor St., Elyria, Ohio

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION • Elyria, Ohio

The CECO-DROP makes other gravity drop hammers obsolete

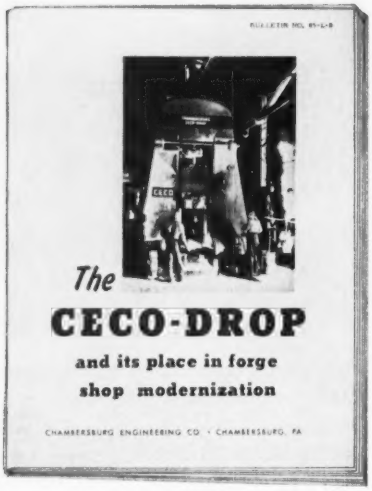


THIS is no mere slogan; it is a statement of fact. Since its introduction twelve years ago, the Ceco-Drop, in installation after installation, has proved its greater productive capacity and its economy over any other gravity drop hammer.

These are not unsupported claims. They are backed up by testimonials from users: like **"increased production over board drop between 10-20%"**; "die life on the Ceco-Drop is nearly double"; **"the first two Ceco-Drops have saved approx. $3000 each** in maintenance and boards in first year"; "after approx. 1200 production hours, one Ceco-Drop had total of less than 10 hours maintenance"; **"I would give a good deal if I had all of our board hammers out of the shop and nothing but Ceco-Drops"**; and hundreds of others.

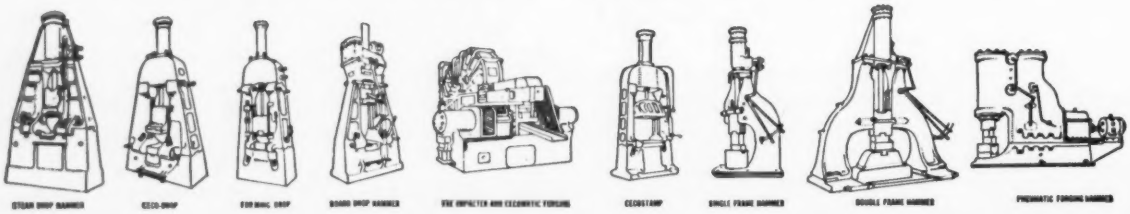
To convince yourself, you should read Chambersburg's 28-page bulletin on Forge Shop Modernization.

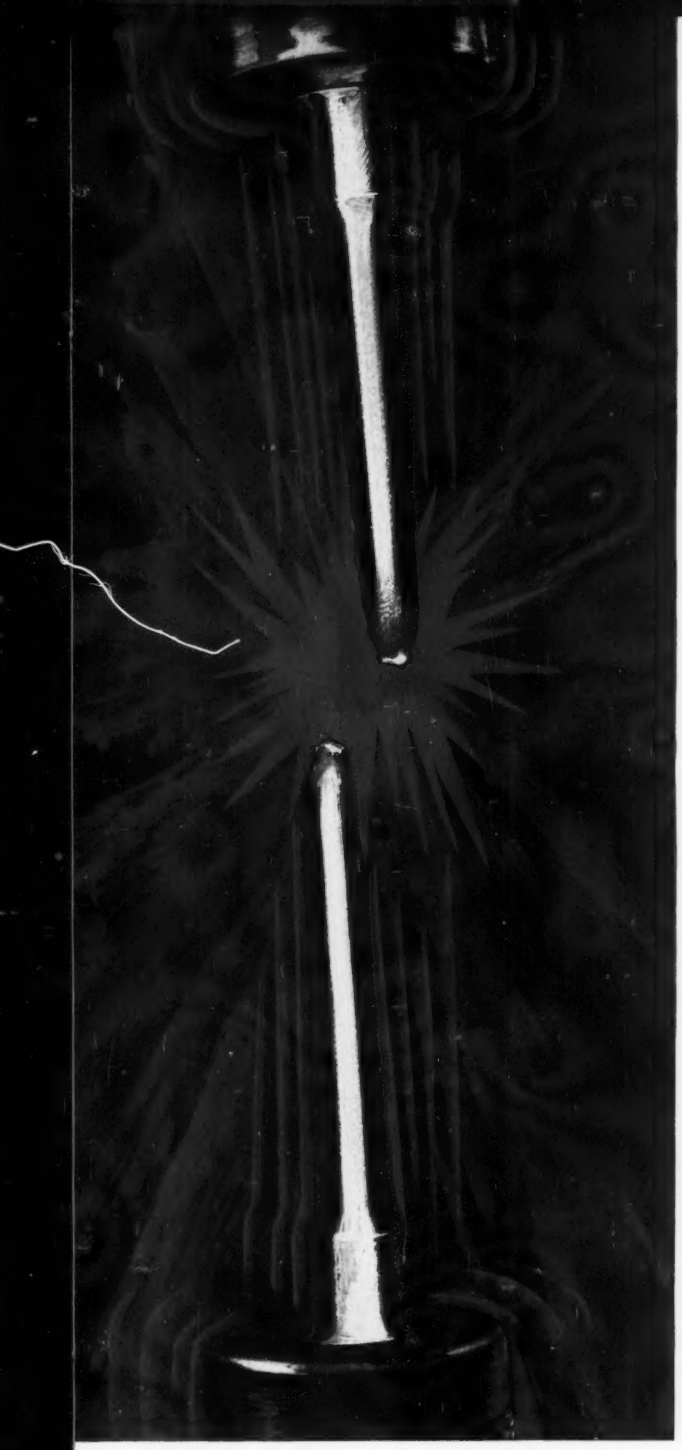
Send for your copy today.



CHAMBERSBURG ENGINEERING COMPANY . . . . . CHAMBERSBURG, PENNSYLVANIA

CHAMBERSBURG • The Hammer Builders





Tensile testing machine in the Jessop metallurgical lab. Stretch, strain and then bang! The specimen of type 304 annealed stainless bar ruptured at 5500 psi above the spec. Tensile strength okay!

"How Jessop Stretches Specialty Steels"

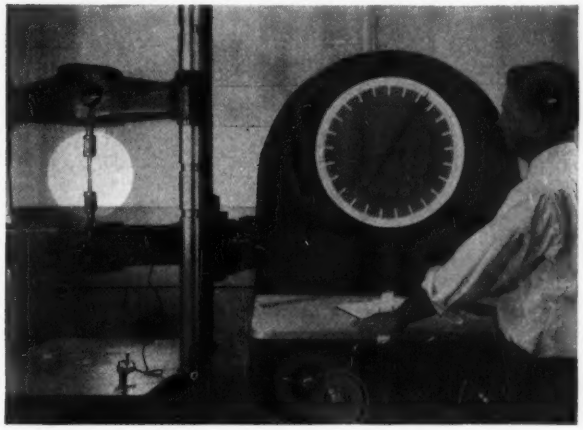
Robert Timko, Metallurgist

"At Jessop, tensile testing of specialty steels is carried out with far more than ordinary precision. It pays. It's one of the reasons our repeat business is so high.

"Based on a series of photographs, this drawing shows a specimen of type 304 annealed stainless steel bar at the climax of a tensile strength test. Moving apart, the heads of the tensile testing machine stretched the bar until it finally ruptured at 5500 psi above the spec."

In this Jessop metallurgical laboratory, top metallurgists using all types of modern testing equipment help us make certain you get *consistent* high quality in specialty steels. *Specify Jessop . . . and then relax.*

VMA 6788



In the Jessop metallurgical lab, this tensile testing machine is one of many types of tools used to make certain you get *exactly* what you want in specialty steels.

Jessop Steel International Corporation
Steel Warehousing Corporation, Chicago
Green River Steel Corporation
Jessop Steel of Canada, Ltd.

JESSOP
STEEL COMPANY
Washington, Pennsylvania

Stainless, alloy, cast-to-shape, clad and forging steels, ground flat stock and other specialty steels

TOP RATED

for fast, free-cutting...high production...long wheel life

SIMONDS WHEELS FOR CENTERLESS GRINDING

"Ground 70,000 pieces compared to 45,000." "Held corners and shape better than wheels previously used." "Entirely satisfactory. Gave excellent finish." These comments from users* are some reasons why Simonds Centerless Wheels are rated superior for job-to-job dependability . . . and good reasons why *your* way to accurate, lower cost centerless grinding may lie in switching to Simonds Wheels. Write for bulletin ESA 55.

*Names on request.

CALL YOUR SIMONDS DISTRIBUTOR

Proven products
Dependable know-how
Quick supply

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BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO • SHREVEPORT
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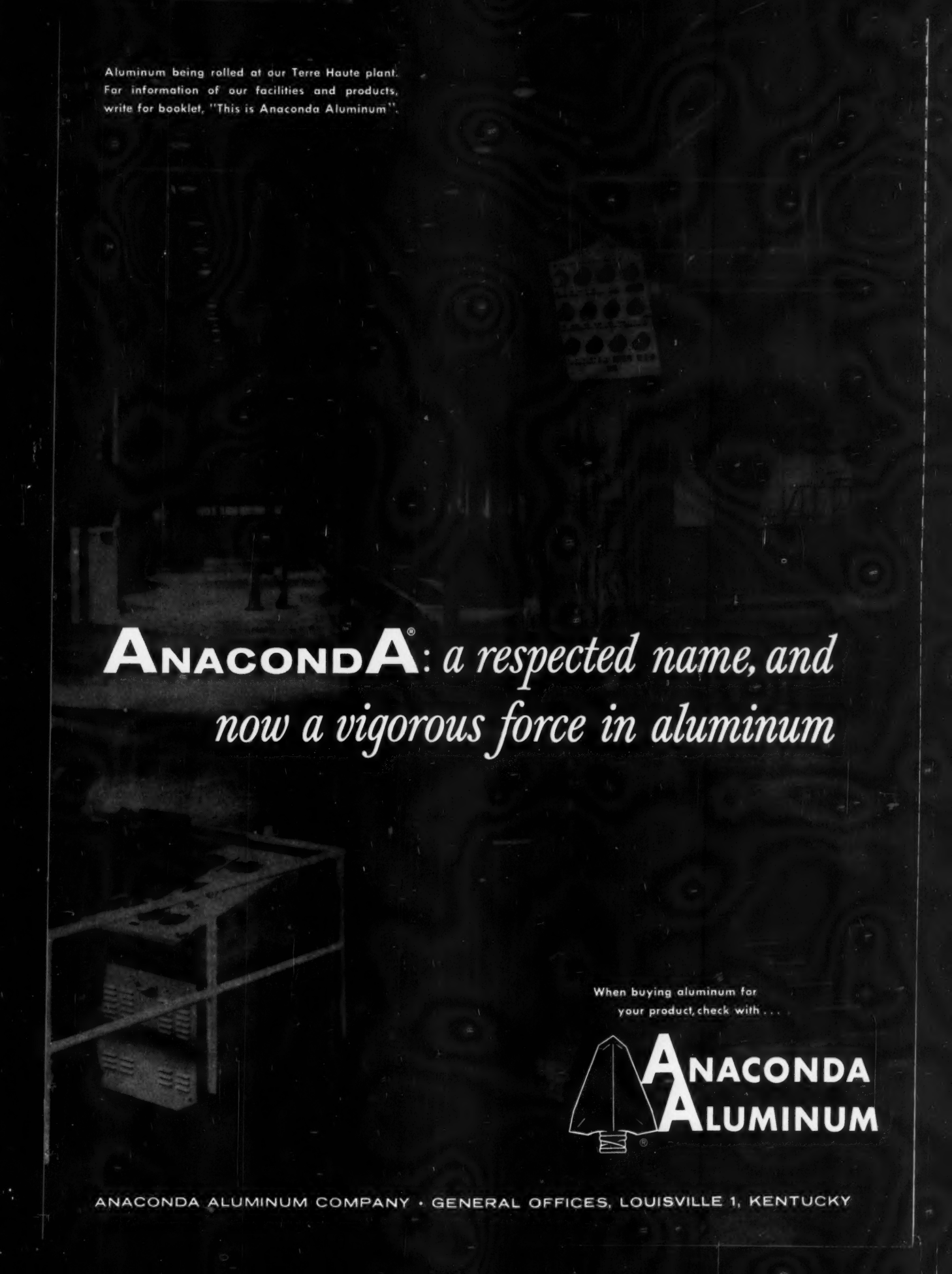
REGULATING WHEEL

Rubber bonded feed wheels exceptionally long wearing and have good traction . . . perfect mate for the Simonds Grinding Wheel.

GRINDING WHEEL

Job-proved Grain and Grade Specifications for all materials. Karvit bushed non-metallic center hole for better mounting and balance.



Aluminum being rolled at our Terre Haute plant. For information of our facilities and products, write for booklet, "This is Anaconda Aluminum".

ANACONDA®: *a respected name, and now a vigorous force in aluminum*

When buying aluminum for your product, check with . . .

ANACONDA ALUMINUM®

ANACONDA ALUMINUM COMPANY • GENERAL OFFICES, LOUISVILLE 1, KENTUCKY

Trailer axles take shape as automatic butt welder upset flash welds spindles to each end of 40-inch lengths of Pittsburgh Steel Co.'s mechanical tubing at Kenton, Ohio, plant of Rockwell-Standard's Transmission and Axle Division.

An Axle Axiom: Long Service Life

Pittsburgh Steel Company's Seamless Tubes Give Years of Service in Rockwell-Standard Corp.'s Trailer Axles

Mechanical tubing from Pittsburgh Steel Company covers a lot of ground —in truck trailer axles.

Pittsburgh Steel is a prime supplier of mechanical tubing to the Kenton, Ohio, trailer axle plant where the Transmission and Axle Division of Rockwell-Standard Corp. makes trailer axles for every major trailer manufacturer.

• **Uses C1040 Grade Tubing**— Rockwell-Standard uses AISI C 1040 grade hot rolled tubing, ranging from 4-inch outside diameter with a 3/16-inch wall thickness to tubing 6 inches in diameter with 1/2-inch wall.

Typical tubing shipped to Rockwell-Standard is made of fine grained steel in a uniform hardness range which enables the customer to develop the final physical properties he wants by heat treatment.

Pittsburgh Steel tubing performs satisfactorily in Rockwell-Standard's processing operations and satisfies the ultimate user—the trailer manufacturer —because we meet these requirements from tube to tube and from shipment to shipment.

Hardness is a prime requirement because lack of uniformity would require more costly operations at Rockwell. With Pittsburgh Steel tubes, heat treating can be standardized with predictable results.

Weldability scores high. Long service life of trailer axles demonstrates the weldability of Pittsburgh Steel's tubing. With an average of

10 welds in every axle, welds have to be good. Strength and porosity tests prove they *are* good.

Freedom from scale helps promote predictable results from heat treating. Scale would produce steel with different rates of hardness after heat treating. No de-scaling operation is necessary with Pittsburgh Steel tubes.

Uniformity of wall thickness helps to prevent warping of axles in oil quenching and eliminates re-straightening in many cases or holds such operations to a minimum.

• **Tubing first is cut to length** by Rockwell to make axles which will track either 70 inches or 71½ inches, both standard widths. Forged spindles then are flash upset welded, one on each end of the tube. Welds are made simultaneously.

Next, tube and spindle assemblies pass through a high heat furnace on a moving conveyor. For the two hours each assembly is in the 60-foot long furnace it is subjected to a temperature of 1500 degrees F. Each 1½ minutes, an assembly emerges from the furnace to be oil quenched.

To temper the assemblies to the desired Brinell hardness, each passes through a draw furnace where it soaks for an hour in 1000 degrees F.

Rockwell-Standard wants a rating of 269 to 321 for spindles and 218 to 269 for tubing.

Axles then are cleaned by shot in a Wheelabrator and moved to the Machine Shop. Spindles are machined to final contours, welding flash is removed and threads are machine rolled.

• **After accessories,** like spider brackets, diaphragm brackets and cams are welded to the axle, stress relief follows to ease strains set up by welding. An hour's treatment at 900 degrees F. does the trick.

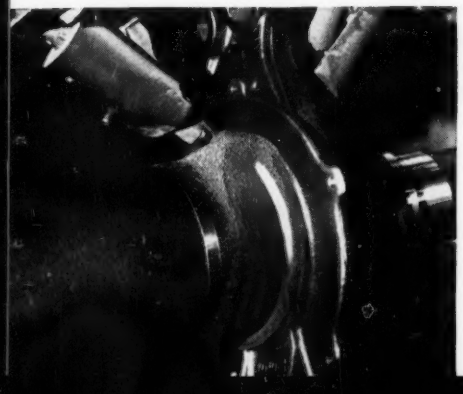
On the final assembly line, each axle gets a brake system fitted to the brake spiders. Nylon support brackets and grease fittings are added, the axle is greased, painted and moved to the shipping platform.

Pittsburgh tubing, five inches in diameter, is being ground to .4880 inches to meet specifications.

You don't have to be a manufacturer of axles to enjoy the same benefits that Rockwell-Standard gets from Pittsburgh Steel tubing.

Any tube user who wants to lower production costs while making a better product can profit by using Pittsburgh Steel tubular specialties.

You get the physicals you want and you can expect better performance in fabrication. Talk to a Pittsburgh Steel man today. You'll find him in one of the district offices listed below.



Close-up of brake spider being submerged arc welded. Four welds are made simultaneously.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Perry Kilsby, Inc.
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

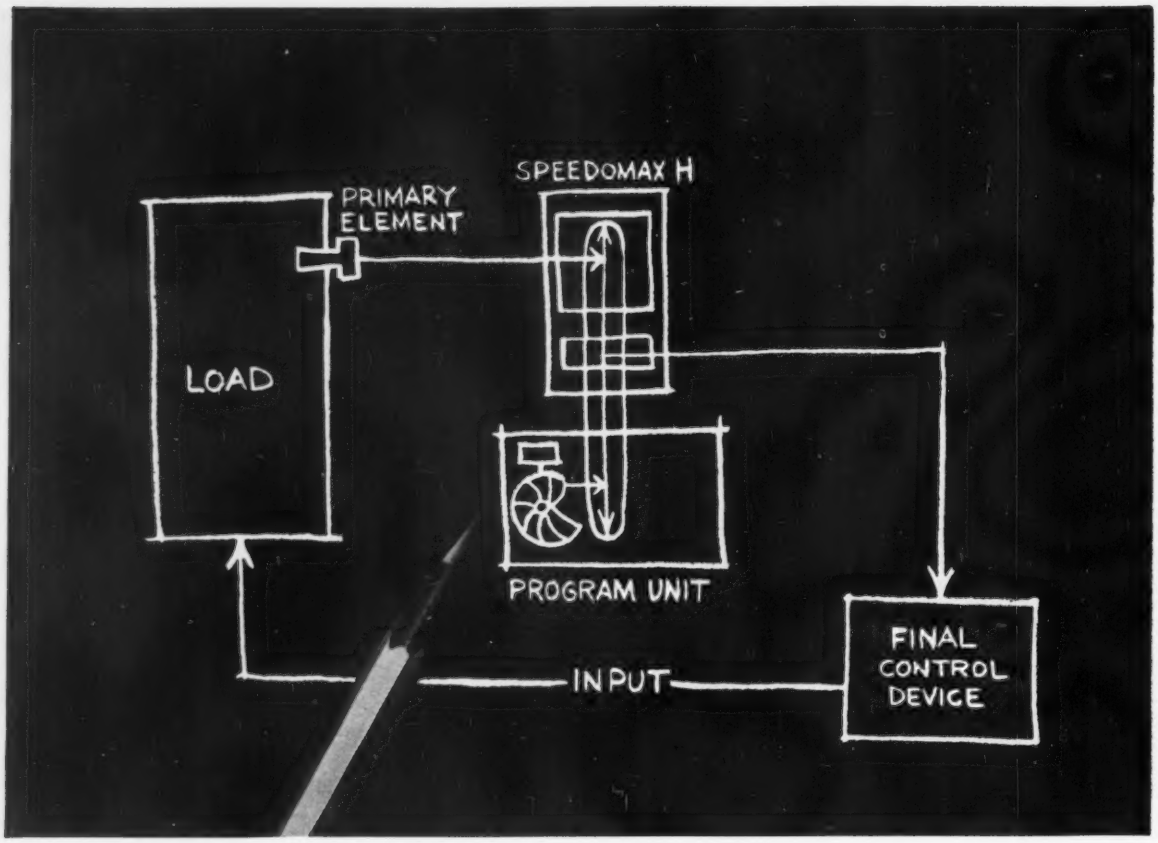
Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta, Chicago, Cleveland, Dayton, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Tulsa, Warren, Ohio



Reproduce your time-temperature cycles exactly with L&N cam-type program control

At the flip of a switch you can heat . . . soak . . . and cool at a preset rate for a preset time with L&N's improved cam type program control! Whether your program is linear or non-linear, this control will continuously regulate input to reproduce *your* cycle . . . again and again.

Heart of the system is the program unit. Essentially it's a motor-operated cam and a control slidewire. The cam is calibrated . . . making it extremely easy to lay out and cut to any time-temperature cycle. Changing a cam to meet a new program takes only a minute. For additional flexibility, the unit has seven standard speeds . . . permitting a multiple number of programs.

Other elements in the control system include a primary element, a Speedomax® recorder and associated control relay, and a final control device. Any change detected by the primary element and measured by the recorder is checked by the program unit, which regulates the final control device to keep the process on cycle.

Also available is a motor-operated front setter type of program control. Recommended for linear programs only, this system offers great flexibility within the range selected.

Both types are available for Two-Position or proportioning control . . . will regulate input to electric or fuel-fired furnaces.

Can your process benefit from programmed heating and cooling? If so, it'll pay you to investigate L&N program control. For more information, call your nearest L&N office, or write 4957 Stenton Ave., Philadelphia 44, Pa. Ask for Data Sheet ND46-33(4).

LEEDS Instruments N NORTHRUP Automatic Controls • Furnaces

Crucible stainless highlights the quality in your product

This is because Crucible precision-rolls stainless to produce finishes of incomparable lustre. Not only that, Crucible methodically checks each heat to ensure uniform physical properties and accurately controls gauge with electronic measuring devices. For stainless in all gauges down to .010" and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE STEEL COMPANY OF AMERICA

CANADIAN DISTRIBUTOR — RAILWAY AND POWER ENGINEERING CORP., LTD.

Extruded bar section and a forging joined by flash butt-welding cut cost of flange ring

Take a segment of extruded bar stock. Form it into a 280° circle, and flash butt-weld a hefty forged insert into the opening. This is how Amweld® saves one customer 56 pounds of expensive titanium on a single part.

These flange rings, used in jet aircraft engines, are an example of the versatility of Amweld's skill in welded fabrication. Not only are material costs substantially reduced, but finish machining time is drastically cut.

American Welding has been supplying welded precision parts and assemblies to industry and military customers for more than 40 years, and has been a leader in developing cost-cutting methods of fabrication. Write today for our catalog of Welded Precision Assemblies—or mail us your blueprints and specifications. Our knowledge and experience are available to help you to reduce your fabricating costs.

GET THE FACTS ABOUT AMERICAN WELDING

Complete information. Facilities brochure, Precision Assemblies Catalog, and booklet on "How Flash Butt-Welded Rings are Made."

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AMERICAN WELDING

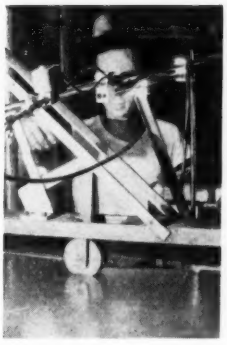
What Reuther Wants In '61

Profit sharing for everybody, fewer working hours, more whitecollar members, a counter to automation—those will be the big objectives of the United Auto Workers when they come back to the bargaining table in 1961. Mr. Reuther believes that 250,000 to 300,000 whitecollar workers could be organized by the UAW in the auto, aircraft, and farm equipment industries. Probably the biggest issue in '61 will be profit sharing. The UAW's proposal will be an attempt "to find a mechanism to share profits," says Mr. Reuther (Page 101).

Cross Co. Is Forced to Deal With UAW

Cross Co., Detroit builder of special machines, will meet in negotiating sessions with UAW Local 155. The move came after a Federal District Court upheld the union's right to represent the firm's workers. The company has refused to bargain with the union which has been on a violence-marred strike for 76 days. Last October, the union won an employee election by a narrow 16 votes.

Chrysler Reduces Its 'Waste Line'



The auto industry takes a giant step toward better quality as Chrysler Corp. introduces an ultrasonic scanner that will locate and mark defects in steel sheets before they go through expensive forming, assembly, and finishing operations. Result: Lower production costs for Chrysler and better car bodies for the buyer (Page 117). Slivers and splits in cold rolled sheet steel have long been a problem for the auto industry. The development enables Chrysler to detect the defects while scanning sheets at speeds up to 375 fpm.

11 Areas Taken Off Labor Surplus List

The Labor Department removed 11 areas from its labor surplus list this month. Coming at a time when the secondary effects of the steel strike are building to a climax, the move indicates how other industries are booming. It also signals a tight labor market for the 60s. Only 11 areas remain

in classes E and F (designating substantial labor surpluses); 35 areas were in those categories a year ago. By contrast, there are now 27 areas in class B (denoting little unemployment) vs. two a year ago.

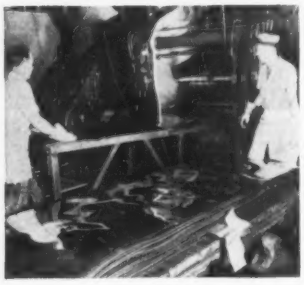
Opsearch Is for Smaller Firms Too

In just ten years, this problem solving technique has jumped the gap between military and commercial applications. Practitioners report that even smaller companies are stepping up their interest in it. While it's still expensive, and usually takes a lot of time, the potential payoff is so great that it's worth investigating. At least six avenues lead to OR (Page 106). An increasing number of colleges offer consulting services. And opsearchers believe that industry associations could make the approach available to their members.

Job-Hopping Looms Again

The Bureau of Labor Statistics reports that the quit rate (which reflects employees' evaluations of job availability) rose to 18 per 1000 last month compared with 12 per 1000 a year ago. It's an indication that companies should take a look at their personnel policies to hold onto the good men they have. Labor turnover is on the rise: Hirings were 36 per 1000 in August vs. 33 in July. Total separations rose to 35 per 1000, reflecting layoffs in steel consuming industries.

Nickel Sellers Step Up Promotion: Sales Jump



Nickel producers are fighting their way back from a serious sales slump. They're using "hard sell and promote like hell" tactics to broaden their markets. And they're offering better supply and price stability. Sales are on the way back. This year's domestic consumption will climb to about 210 million lb vs. 160 million lb last year. And this year's output was cut by the steel strike (Page 102).

Du Pont Exec Blasts Depreciation Laws

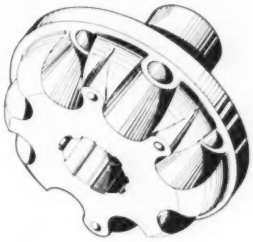
American living standards and defense strength are gravely threatened by "grossly inadequate" depreciation allowances, declares T. C. Davis, vice president, Du Pont Co. "We are only eight or ten years away from the time when . . . we must increase our GNP from around $475 billion to nearly $700 billion—unless we accept substantially lower living standards." He says industry spent $244 billion for plant and equipment from 1946 through 1957—$76 billion more than the facilities would cost in 1946, due to inflation. "Yet the depreciation laws remain unchanged, as if the dollar would still buy as much as it did."

Can't Export Products? Try Money and Knowhow

Europe seems to be building up resistance against American exports. But there appears to be no resentment toward products made in Europe by U. S. firms. W. Cordes Snyder Jr., president, Blaw-Knox Co., Pittsburgh, just back from his seventh European junket in 18 months, reports that "U. S. industrial companies will have to make additional investments in production facilities throughout Western Europe if they want to remain factors in those markets." He adds: "Interest abroad in primary equipment, in engineering, in design, and in technical knowhow probably has never been greater." Raytheon Co. is now doing foreign market research to determine what products it can build abroad.

Resulfurized Steel Cuts Part Costs

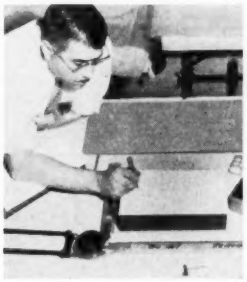
The Austin-Western Works of Baldwin-Lima-Hamilton Corp. has made large cost reductions on four auto parts by substituting a resulfurized steel, 1132, for the steels it had been using. Example: It's saving $1.91 per part on the driving hub (right). On a ball stud for a road grader, the material switch is saving 26 cents per part. This is another article in STEEL's Cost Crisis series (Page 148).



Communication Equipment Volume to Double in Decade

The Business and Defense Services Administration predicts that sales of communication equipment will hit $4.65 billion by 1968—nearly double the 1958 volume of $2.48 billion. This year's output will total about $2.65 billion, says BDSA. Sales in 1950 were less than $1 billion.

New Methods Make a Die in 15 Hours vs. 250



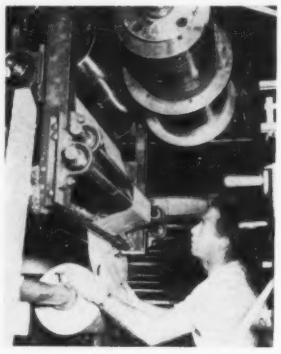
You can trim the cost of diemaking an average of 70 per cent, claims Albert E. Payne, president, Pay-Les Die Div., Payne Tool & Engineering Co., Springfield, Ohio. And maintenance costs are lower, alignment is no longer a problem, dies are accurate. Much of the secret in the new method is the elimination of the slow layout work. Also, practically all metal is removed by drilling instead of kellering (Page 168).

Looking for More Information Plus a Tax Deduction?

Your company can get both if it helps sponsor the University of Michigan's Survey Research Center. It's a source of information on the financial status of consumers and their buying attitudes. Its work has been entirely supported by the Federal Reserve Board, but slimmer budgets have forced the FRB to reduce its 1960 grants. The center is seeking industrial sponsors to fill the void. It offers sponsors detailed reports on its findings. And the

grants are tax deductible. Ford Motor Co. is among the half dozen firms that have already offered aid.

Steelmaker Adds Plastic Coating Line



Plastic coated steel strip is gaining popularity in many markets (examples: furniture, appliances, autos). Bright prospects for the product are causing producers to expand their facilities. National Steel Corp.'s subsidiary, Enamelstrip Corp., Allentown, Pa., is installing a 48 in., continuous, processing line. The company will be able to duplicate any design that can be photographed. Grain or texture is printed on transparent film which is bonded to the metal surface with a pigmented adhesive that adds color (Page 185).

Red China Opens Big Steel Complex

The Chinese Communists have started operating the first blast furnace in a huge steel complex under construction at Paotow, 400 miles northwest of Peiping. By the early '60s, the center is expected to equal the current capacity of the complex at Anshan—6 million tons annually. The new blast furnace will produce 900,000 tons of pig iron annually. It'll be a strong factor in Red China's bid to produce 12 million tons of steel from modern plants this year. (The country also turns out several million tons of low quality steel from small, inefficient furnaces.)

Russia Has Trademarks and Patents

The trademark, traditional symbol of competition, has been adopted by government-owned Russian factories, reports the U. S. Trademark Association. Some shops make their products better than other shops. So they are allowed to sell them at higher prices and people stand in line to buy them. They're identified by signs similar to our trademarks. Russia has a patent system too, under which inventors may obtain incentive awards.

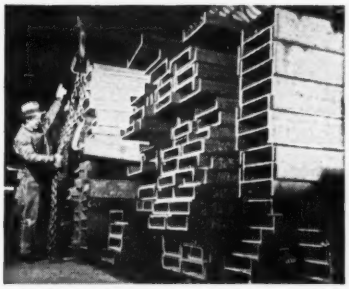
Straws in the Wind

The federal government will apportion $2,725,000,000 among the states for highway construction during the fiscal year beginning July 1 . . . Dow Chemical Co. cut polystyrene plastic prices 1 cent to 2.5 cents a pound . . . Chance Vought Aircraft Inc. is working on a nuclear powered missile called the "Slam" . . . More than 500 million coat hangers are made annually, reports AISI . . . Many distributors are serving more than half their customers at a loss, assserts L. D. Montague, president, Southern Industrial Distributors' Association. Reason: Too little knowledge of true costs . . . Producers of plastics will employ 250,000 persons in 1965 vs. 200,000 today. The industry will add 10,000 engineers by '65, 10,000 skilled workers by '62, estimates Society of the Plastics Industry Inc.

REPORT FROM RYERSON on Services and Products in Stock

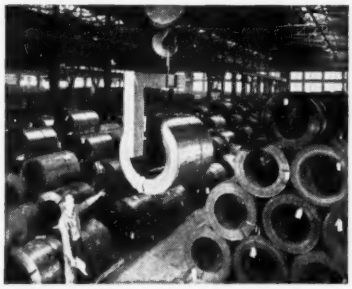
In spite of heavy demand, we are currently able to meet most requirements for all the steels listed below. In addition, a wide range of construction steel products is quickly available—including fabricated re-bars for reinforced concrete and post-tensioned assemblies for prestressed concrete. There are also no shortages in Ryerson service on aluminum, industrial plastics and metal-working machinery. Consult your red Ryerson catalog for the complete list—and call us for whatever you need. If it's available, you're more likely to find it at Ryerson than anywhere else.

CARBON STEEL & ALLOY BARS
Most complete range of types, shapes and sizes as well as largest tonnage.

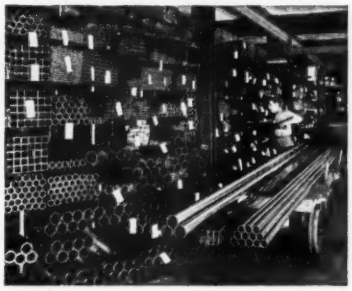


STRUCTURALS—I-beams, H-beams, channels, angles, tees and zees—all high quality steel to ASTM spec. A-7.

PLATES—14 types including special low carbon steel plates for forming and welding, leaded New E-Z-Cut, etc.

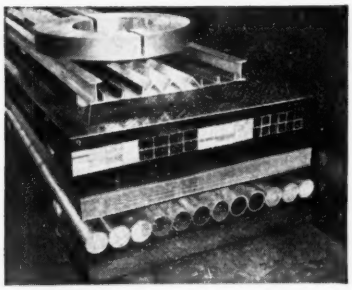


SHEET STEEL & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.



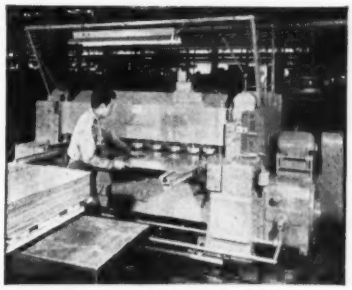
TUBING—Seamless and welded steel tubing—mechanical tubing, fluid line, pump cylinder and structural tubing.

STAINLESS STEEL—For immediate delivery. Over 2351 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.



ALUMINUM—At many Ryerson plants—sheets, coils, plates, bars, tubing, architectural and structural shapes, etc.

INDUSTRIAL PLASTICS—PVC pipe, fittings, sheets and rods, rigid Kralastic and flexible polyethylene pipe.



MACHINERY & TOOLS—The broadest line of metal-working equipment available from a single source.

RYERSON CERTIFIED QUALITY

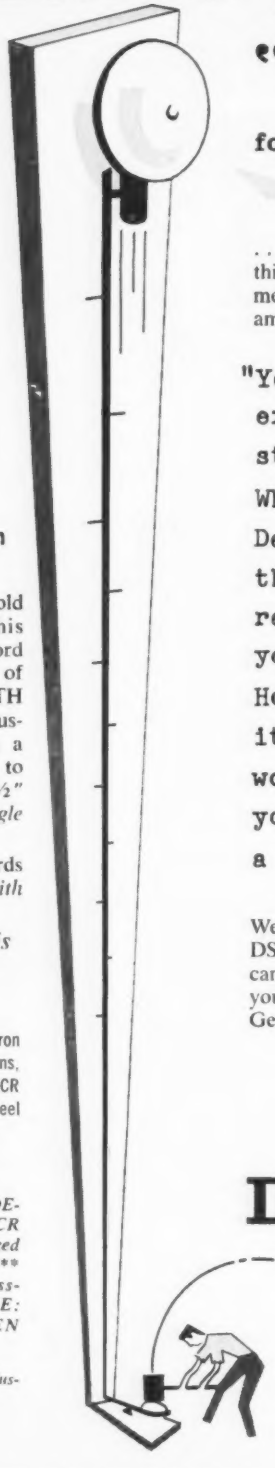
RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY
NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

Detroit Steel
PERFORMANCE
"rings the bell"

for a major heating furnace manufacturer



. . . and we quote from an unsolicited letter reporting this organization's recent "detailed evaluation of the merits and capabilities of our steel suppliers . . . among whom Detroit Steel is now one of our largest."

"Your delivery and service have been excellent. These two factors make a steel buyer's duties much more pleasant. When it comes to quality, this is where Detroit Steel Corporation really "rings the bell." We have had not one single rejection against your company in five years. Maybe part of this is sheer luck. However, I would be inclined to think it is the end result of a lot of hard work, know-how and a desire to improve your position in the industry by doing a good job.

We invite you to look into the probability that the performance of DSC-PORTSMOUTH Accutronic* COLD ROLLED SHEET STEEL can "ring the bell" for you, too . . . Talk over your requirements with your DSC Customer "Rep" — or write Detroit Steel Corporation, General Sales Office, Box 4308, Detroit 9, Michigan.

"Not one single rejection in five years"

The DSC Accutronic* Cold Rolled Sheets scoring this long-term performance record were supplied in thousands of tons by our PORTSMOUTH DIVISION . . . Rolled to customer specifications, in a thickness range of .0239" to .0897", in widths from 27½" to 48"— and *"not one single rejection in five years."*

DSC job-performance records show the way we'll work *with* and *for* you.

Customer satisfaction is our No. 1 Job.

DSC PRODUCTS

Coke . . . Coal Chemicals . . . Pig Iron Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods . . . HR and CR Sheet and Strip . . . Flat CR Spring Steel Mfrs'. and HC Specialty Wire Welded Wire Fabric

*Accutronic *is a DSC TRADE-MARK, descriptive of DSC CR Sheet and Strip Steels, cold reduced on mills equipped with AccuRay** electronic feed-back thickness-control systems. PURPOSE: LEVEL GAUGE and EVEN TEMPER.*

***A registered trade-mark of Industrial Nucleonics Corporation*

The PROOF of DST®

DETROIT STEEL

is in its performance on your job

Customer "REP" Offices in Principal Cities

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Ask the Steelworker's Wife

David J. McDonald accuses the steel industry of trying to sap the strength of his steelworkers union. He refers to the companies' insistence on revising contract provisions that put a strangle hold on efficiency and promote featherbedding.

Most observers view Mr. McDonald's charge as an emotional appeal designed to consolidate member support and to becloud the issues for the public.

We favor a more direct approach. In our opinion, Mr. McDonald is putting the shoe on the wrong foot. We think the union is sapping its own strength by prolonging the strike. Strikers—and their wives—will see the point if they balance their losses against their gains. Consider these facts:

For six months this year steel wage earners worked 40.1 hours a week, averaged $3.33 an hour, including overtime. Average weekly wages were $133.53.

They now have been on strike 14 weeks. The average striker has lost $1869 in wages.

What would that buy for his family? A new all-electric kitchen? An additional room for a growing family? A down payment on a home? New clothes for his wife and children? Help send his children to college?

Or look at it another way. In June, the companies offered fringe improvements this year and a wage increase next year if the union would co-operate in revising the above mentioned contract provisions. As finally spelled out, that offer amounts to 15 cents over a two year period—or 7½ cents an hour each year.

The union's current demand is for a package costing 30 cents for two years —15 cents an hour each year.

Suppose the union got the 30 cents. Members would have to work 24,925 hours to make up what they have lost in the first 14 weeks of the strike. That would take about 12½ years.

Or consider a more likely possibility. Suppose the union were to win a compromise package worth 10 cents an hour a year. Then it would take the average steelworker 37 years to make up his losses.

What does Mrs. Steelworker think about this? Does she yearn for the new kitchen? The new clothes? The money to educate her children?

Who's sapping the union, Mr. McDonald?

Ask the steelworker's wife!

Walter J. Campbell

EDITOR

After 30 years' service these 8 Cleveland speed reducers needed no new parts!

Here are eight Cleveland Worm Gear Speed Reducers that have been on the job in this wire drawing plant continuously since 1929. Recently they were dismantled — then reassembled without *any* replacement of parts. Good for many more years of rugged service.

This is typical of the type service you can expect when Clevelands handle the right angle transmission of power in your plant. They save space and make for easy installation.

Before you buy machines or mechanize existing equipment, check and see what Clevelands can do to improve your operation. The complete story is contained in Bulletin #145. Write for your free copy, today.

The Cleveland Worm & Gear Company
3270 East 80th St., Cleveland 4, Ohio

A subsidiary of
Eaton Manufacturing Company

Affiliate: The Farval Corporation

CLEVELAND
Worm Gear
Drives

How Steel Users Are Faring

NEARLY a quarter of a million workers in steel-using plants are laid off because of the metal's shortage.

Taft-Hartley injunction or not, that total will increase by about 40,000 a week for the next several weeks. Steel mills will need, on the average, six weeks from the time of work resumption to hit 90 per cent or better of their shipping capacity. They'll need 30 days to reach that rate of ingot capacity. Even those time schedules would be extended if slowdowns occur. That possibility has been threatened by some officers of United Steelworkers locals.

• **The Pinch Is Here**—Steel users have weathered nearly 14 weeks of the strike remarkably well, but now the stocks are dangerously low (see the accompanying rundown). Many consumers can continue operations for many more weeks, but the majority are going to have to curtail or shut down by early November.

Cleveland Cap Screw Co., for example, has already cut operations to an 8 hour, five day week and can last only another two weeks at current production levels. J. I. Case Co., Racine, Wis., has sufficient steel to carry it through October, but November is likely to be difficult. Associated General Contractors fears that new building projects will be held up one to six months because of the strike. A Business & Defense Services Administration spokesman admits "some increase in requests for help in locating defense steel."

• **An Order Pinch Too**—Another ominous note is sounded—chiefly by component makers. Steel founders report cutbacks in production (from five to four days per week) because customers have set orders back as a result of the strike. Malleable founders are experiencing the same thing. And makers of gray iron castings say orders from farm implement makers have been cut back because of the shortage of other components.

The Gray Iron Founders' Society,

Autos—Steel inventories are below minimum working standards. GM is in worst shape and has laid off more than 50,000. It can continue assemblies through October and some parts production beyond that. Chrysler starts a four day week this week at almost all plants except Valiant facilities which stay on five days. It can operate at that rate through the second week of November. Ford can last through mid-November. American Motors can continue through November. Studebaker-Packard can build normally through the first week of December.

Appliances—Mass shutdowns will be necessary early in November, often because part suppliers won't be able to deliver.

Construction—"The steel strike is starting to hurt badly now," says the American Institute of Steel Construction. Look for a sharp drop in shipments by Nov. 1.

Oil Country Goods—Users are O.K. now, but they will have trouble rebuilding stocks sufficiently for normal spring operations.

Farm Equipment—Spot shortages exist, but November will be much more difficult except for International Harvester which makes part of its own steel.

Cans—Canmakers' stocks are adequate now, but they may have trouble next spring when they hit their peak demand.

Capital Goods—In general, the machinery builders anticipate little trouble from steel shortages except as they will occasionally hit their suppliers.

Fasteners—Some 15 per cent of Industrial Fasteners Institute members have already had to cut back. Steel inventory levels vary widely among manufacturers. Some can continue producing part of their line for 10 or 12 more weeks, although they are running out of steel for other lines now.

Steel, Malleable Castings—No troubles yet on raw materials, but producers have had to curtail production from five to four days a week from lack of orders attributed to the steel strike.

Gray Iron Castings—Raw materials are good until at least the first of November.

Stampings—Most stampers have enough steel to keep going through October, but many may be in trouble in three or four weeks.

Screw Machine Products—Manufacturers are just beginning to feel a pinch. Current stocks are good until mid-November.

Defense Hardware—Contractors have not been materially affected, but an occasional spot shortage is reported. Example: Scarcity of wide sheets may hurt the Polaris program.

incidentally, is one of the latest groups formally to pledge its support for the steel companies' bargaining position. With few exceptions, steel users are backing the steel industry despite the growing pinch on metal supplies. And organized labor is solidly behind the USW.

• **Stalemate Continues**—The stalemate between steel management and labor was clearly evident last week as both sides presented their cases to President Eisenhower's strike inquiry board. Nothing new came out of the hearings.

Wickwire Bros. Grants Pay Hike in New Pact

Wickwire Bros. Inc., Cortland, N. Y., a small producer of wire products, signed a contract with the USW effective Oct. 1, calling for a wage increase of 7 cents hourly this year, 8 cents hourly next year. Other concessions: An extra holiday, increased insurance, and changes in seniority rules. The company had been operating on an extended contract.

Ore Shortage Certain, but Steelmen Hope to Get By

ALTHOUGH iron ore supplies will be tight next spring, steelmakers still think they'll scrape through if lake shipments get started within the next week and weather permits navigation well into December. Increased use of imported ore and scrap in steel melts will ease the pinch somewhat.

Something like 15 million to 20 million tons of ore may still be brought down the lake route before the freezeup in mid-December. The fleet can start moving within three or four days after work is resumed.

Shipments of Lake Superior ore to Oct. 1 this year totaled 34,202,162 gross tons vs. 38,276,548 in the like 1958 period. In September the movement was only 758,314 tons vs. 8,705,886 in the same month last year. The strike has cost at least 42 million tons of ore so far.

• **Stocks Are Smaller**—There isn't too much concern over the ore situation as yet. Unofficially, it's estimated stocks at the yearend will total possibly 48 million tons, including imports, just about enough to support high-level steelmaking beyond the opening of navigation next spring. But imbalances with respect to grades may be a headache. Stocks at the end of 1958 were 68,833,658 tons.

While there's considerable talk of bringing down Lake Superior ore all-rail this winter, the railroads have not been alerted for an unusual tonnage movement.

• **Carriers Are Ready**—If the railroads are called upon, they will be able to handle the additional load. Idle ore cars at the head of the lakes, equipped with steam vents for handling frozen ore (a big problem), will be available—so will hundreds of idle hoppercars at lower lake points. The rail movement of ore never has exceeded 7.9 million tons in any one year.

The carriers anticipate a heavy movement of imported ore from Atlantic Coast ports to inland furnaces this winter. Large stocks of foreign ore (millions of tons) are at both Atlantic Coast and Great Lakes ports.

Latest data show ore imports in the first six months this year totaled 14,690,067 gross tons vs. 11,736,559 in the like 1958 period.

Strike Losses

(Through Oct. 19)

Lost Steelworker Wages

$998,800,000

Lost Sales

$2,898,000,000

Lost Production **(ingots tons)**

27,460,700

Other Losses

Overhead, depreciation, and salaries of nonproduction workers in steel.

$552,000,000

Tax Losses to U. S.

$630,000,000

Foreign Steel Is Pouring Into Great Lakes Ports

Large tonnages of steel continue to be imported at Great Lakes ports.

The foreign tonnage is up sharply at Buffalo, where it's estimated that at least 25,000 tons have come into the country since mid-June. Recently, large shipments have been moving into the area from Canada.

Most of the steel is from Western Europe, but the volume of Canadian steel is also up.

Two large foreign shipments are scheduled to be unloaded at Cleveland before the end of this month.

Walter Reuther gives advance notice to industry on . . .

What to Expect from UAW

UNITED AUTO WORKER President Walter Reuther wants profit sharing for all, a shorter workweek, a cushion for automation's effects, and more whitecollar members.

Those were the main bargaining and organizational objectives he revealed to union members—and industry—last week at the UAW's convention in Atlantic City.

• **Profit Sharing** — Profit sharing may be the biggest issue when the union meets the auto companies at the bargaining table in 1961. The proposal was advanced in the 1958 negotiations but quietly dropped when the Big Three turned it down. The idea was this:

Figure the equity which workers and consumers should share with the same profit plan now used by General Motors Corp. and Ford Motor Co. to compute executive bonuses.

One-half of the sum now earmarked for executive bonuses would go to stockholders and executives. One-fourth would be earmarked for wage and salary workers and one-fourth to consumers through a year-end rebate.

"The steel strike," claims Mr. Reuther, "revolves on the question of sharing profits among workers, stockholders, and consumers. The UAW's proposal will be an attempt to find a mechanism to share profits. Executives share in profits. Why can't the workers?"

• **Shorter Workweek**—This demand will be another hot one in 1961. It was planned as the major issue for 1958 negotiations, then dropped as business conditions worsened. The profit sharing idea was substituted. If some economists are right about a continued boom into 1961, the reduced-hours proposal will be dusted off.

• **Automation**—This is one of Mr. Reuther's pets.

The union now has 1,143,707 members—against a 1958 average of 1,026,050. That's the first real advance in a long time. Over the years, UAW's bluecollar membership will slide—"because we'll make more technological progress in the next ten years than in the past 25," the union president believes. His program for new contract provisions to offset the effect of automation:

1. Strengthen transfer rights.
2. Provide for preferential hiring of displaced workers by the other plants of the same corporation and by other companies in the same industry and area.
3. Negotiate new job classifications required by technological change.
4. Protect the integrity of the skilled trades.
5. Establish training programs (at company expense but under joint control of management and the union) that will enable workers to maintain or improve their earnings in the face of technological change.

• **Drive for Whitecollar People** — Mr. Reuther estimates that 250,000 to 300,000 whitecollar employees could be organized by the UAW in the automotive, aircraft, and farm equipment industries. In the automotive field, total employment in 1951 was 854,500; of those, 717,900 were production workers and 136,600 were whitecollar, or 16 per cent of the work force. In 1957, total employment dipped to 786,300, but the number of whitecollarites rose to 156,200, 20 per cent of the total.

The UAW leaders look to whitecollar organizational drives to rebuild the union's numerical strength. They are stepping up their efforts in this area now and are also serving notice on what general contract demands they'll make in '61.

Nickel Marketers Try Hard Sell

NICKEL MARKETERS are hitting the comeback trail this year. They're banking on hard selling and savvy in marketing to boost their industry's participation in the sharp U. S. economic recovery.

As recently as 1957 the industry was floundering in overproduction, with facilities under development that could dump another 175 million lb of the metal on the Free World market within four years.

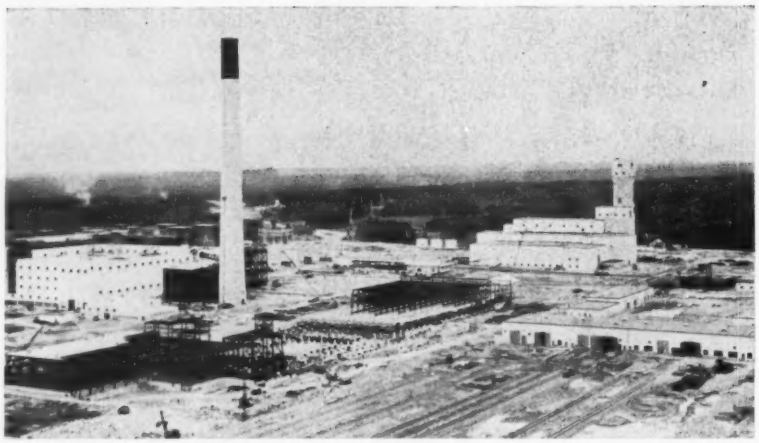
• **Behind the Dilemma**—Wartime shortages extended through the 1940s. Then came Korea and Uncle Sam's decision to build up a strategic stockpile. Result: Too little nickel to satisfy demand.

Market development was a myth. Users began designing nickel out of their alloys.

The picture changed almost overnight. Stockpile goals were reached earlier than expected. The government decided it had grossly overestimated needs and cut original estimates in half. Some of the expansion contracts that called for diversion of metal to the Defense Production Act inventory were running out. Production was around 150 million lb a year greater than it was at the end of the Korean War. Defense requirements were falling. To make matters worse, along came the recession. The marketer was faced with a buyers' market. Unless he was an oldtimer in the nickel business, it was a new experience.

• **Bouncing Back** — These figures show how well he met the challenge: North American nickel consumption this year should hit about 210 million lb compared with 160 million lb last year. If it hadn't been for the steel strike, the figure would have reached about 260 million lb, the best year since 1956 and a near record. Free World consumption this year should jump to around 400 million lb, 80 million lb better than it was in 1958.

Gratifying to nickelmen is the rapid comeback the metal has made in the U. S. (We take around 65 per cent of the Free World supply.) In the first half, the U. S. industrial machine chewed up 130 million lb—30 million lb less than it used in all of 1958.



TWO NEW FACILITIES, 2200 miles apart, will eventually add 125 million lb to the Free World's annual nickel capacity, which will prevent any shortage in the foreseeable future. The plants will begin operations in 1960. At top is International Nickel's $115 million mining and smelting complex at Thompson, Man. At bottom is Freeport Sulphur's refinery at Port Nickel, La., part of its $119 million nickel-cobalt investment that includes mining and processing facilities in Cuba

• **Day of the Marketer**—You can't pin down how much of the recovery has been due to the better world business climate, or to greater metal availability, or to the "hard sell-promote like hell" approach. But it's no secret that nickel people have been out beating the drums harder than they ever have.

Take the world's largest nickel salesman, International Nickel Co. Inc. Until recently it was a conservative, mining-oriented firm with a reputation for good management and steady dividends. It is now geared for marketing. The last 18

Comeback

Free World Nickel

Capacity more than doubles in a decade

(Millions of lb)

1951	286.0
1953	335.2
1955	438.3
1957	489.0
1959	550.0
1960	605.0
1961	665.0

Source: International Nickel Co. Inc. and STEEL estimates.

Where Nickel Goes

Market	Percentage
Stainless Steels	27
Construction Steels	16
High Nickel Alloys	16
Nickel Plating	13
Iron and Steel Castings	12
Copper and Brass Products	6
All Others	10

Based on 1958 Free World consumption.
Source: International Nickel Co. Inc.

months have seen a complete reshuffling of personnel, duties, departments, and even more significantly, attitude.

Inco's promotional activities have taken this tack:

• A two alloy steels program, in co-operation with steel service centers, is designed to increase the consumption of alloy construction steels by convincing users to upgrade—in other words, switch from the carbon steels. Inco's plan: Instead of trying to push a line of products, convince users they can simplify their inventory and plant processing problems (and save) by standardizing on Type 4340 and 4620 steels for most industrial applications which require alloy properties. The program is continuing this year. Backstopping it are national advertising in business, trade and consumer magazines, spot radio commercials in major metalworking areas, and promotional literature. Results to date: Service centers say the program has boosted their sales and stocks of alloy steels; several users report they have standardized on the two steels.

• A push for heavy duty nickel steels and applications that require nickel-bearing alloys.

• A published market study designed for warehousemen, with the alloy steel buying groups broken down by county.

• A promotional program with 32 department stores to stimulate sales of stainless steel housewares and utensils. The program is being expanded to 60 stores this year. The aim for 1960: Have one co-operating store in every major city. Inco provides point-of-sale ads, posters, interior displays, suggestions for window displays, merchandising tips, spot radio commercials, and backstops the whole program with advertising in national media. What makes this program particularly novel: Inco is five steps back in the production-sales-distribution chain. (First, Inco, the producer of the raw material. Second, the stainless steel maker. Third, the cookware manufacturer. Fourth, the distributor. Fifth, the department store.)

• **For Long Pull**—Inco marketers say this is no short range project to get nickel over the hump. Programs started in 1958 are geared to the 1960s. The company has formed such new departments as product development and application engineering to research and expand new markets, alloys, and uses.

Some of the goals of Inco task force groups are stated by Frank R. Bailey, assistant to the manager of general sales and marketing services department: Greater use of stainless steel sinks, which currently account for about 10 per cent of the market; reversal of the trend away from brightwork in autos; conversion of ex-users of plating back to bright work; increase the number of stainless steels containing nickel from the present 65 per cent; develop more structural steels.

• **Markets: Now and Later**—New uses and some recapturing of old markets are helping to narrow the gap between supply and demand. The Boeing 707 jet contains about 5 tons of nickel, more than five times as much as the powerplant of a piston engine plane. The skin of the X-15 is mostly Inconel 'X.'

The hull of the Polaris firing submarine is fabricated from high-nickel steels. Its launching platforms are predominantly high nickel alloys.

Special alloys have been developed for the gas turbine, when, and if, the automobile industry ever switches over. Mr. Bailey says a gas turbine engine would take 5 to 20 lb of nickel per car.

The nickel-cadmium battery is already finding limited uses in radios, hearing aids, and military equipment. If its high cost can be brought down, uses will spiral.

Keep your eye on nickel plated aluminum in applications that demand high corrosion resistance and superior finish. The combination is already being put to use in flashlight batteries.

The 9 per cent nickel steel has potential in low temperature applications, believes Mr. Bailey.

• **Via the Test Tube**—Nickel research laboratories are working overtime to come up with new and better alloys. Here are some of the latest projects, as outlined by T. N. Armstrong Jr., Inco's product development manager:

Heavier coatings for better corrosion resistance. (A bright coat which doesn't require finishing is sandwiched between a semibright first coating and a layer of chrome on top.)

Abrasion resistant coatings, possibly self-lubricating, to give longer wear resistance.

Coatings in a range of colors.

Nickel base alloys with a higher

load carrying ability at high temperatures (up to 2000° F) via the addition of nonmetallics to the alloy properties, then sintering. Improved alloys for high-temperature steam service (1200 to 1400° F). High strength steels with yield strengths of 300,000 psi.

Higher strength stainless steels with better properties at high temperatures.

Higher strength low alloy steels with good ductility for oil field uses (tubing, drill pipe).

High strength nickel-molybdenum steel for heavy duty parts that are carburized (gears and pinions for earth moving equipment, oil well drill bits).

Alloyed ductile iron for abrasion resistance.

Materials for welding nickel alloy steels via inert gas and submerged arc methods.

Steel plates with a yield strength of 150,000 psi which can be welded in thicknesses up to 3 in.

• **Product Mix**—Even with the new materials and markets expected in the future, don't look for much change in product mix (see chart). For example, stainless steel, the best customer today, will continue to be the top nickel user for good reason: The field's booming!

In the first half, net stainless and heat resisting steel shipments were 390,133 tons—an all-time record for the period. If the steel strike ends soon, shipments should approach the 1956 record of 687,699 tons. Near capacity stainless operations are expected to continue well into 1960. There's a good chance shipments will establish a record in '60—topping 700,000 tons for the first time.

• **Not All Sunshine** — The nickel industry has lots of problems. It has had setbacks in traditional markets like plating and brass mill products. But of most concern is the approaching gap between production and consumption. Take a look at the chart listing estimated nickel capacity and notice that by 1961 the Free World will have the potential to produce about double its total consumption in 1958.

Certainly the market will become more competitive. New mines will be brought in by Inco in 1960-61, and Freeport Sulphur's new integrated complex is due to get rolling around Jan. 1.

The government's latest bid to put its nickel operation at Nicaro, Cuba, on the block further clouds the supply-demand situation. If a buyer is willing to put in an electrolytic refinery and facilities for nickel base alloys and rolled products, Nicaro could become a potent force. But the country's political climate works against the Nicaro sale and the whole Cuban nickel situation. Premier Castro has stated that he's unhappy with the tax arrangements granted under the Batista regime and hints that perhaps Cuba will bid on Nicaro. (The U. S. has specified Nicaro will be sold only to a U. S. firm.)

The future of M. A. Hanna Co.'s ferronickel operation in Oregon is uncertain. All its production through 1962 will go into government stockpile. If Hanna has any plans to enter the civilian market, it's not telling.

The stockpile, particularly the DPA inventory, is like an octopus threatening the market. The DPA inventory has some 120 million lb of metal, and it will grow at the rate of around 75 million lb per year through 1962, unless the companies involved decide not to exercise their options.

It's possible that some of the material, especially that classified as "substandard," will be offered for sale by the government.

• **Plenty of Nickel**—All those factors mean one thing for the nickel consumer. There will be no shortage in the foreseeable future. And that's the way producers want it. Says Charles M. Schwitter, head of Inco's market research: "We want to be sure we never again get into a shortage situation. We'll keep a running forecast of demand and let management know in time so new deposits can be opened up if they're needed."

You can also look for a stable price over the next few years. The industry is not anxious to weaken its battle for new markets with an upward price spiral. Charles J. Brown, vice president for nickel sales, Freeport Sulphur Co., says: "Our industry really hasn't hit its stride. What we have done so far is nothing to what we can and will do."

THIS 3600 RPM TURBINE GENERATOR, being built at Westinghouse Electric Corp.'s East Pittsburgh, Pa., plant, will be installed at the Helena Steam Electric Station of Arkansas Power & Light Co. Weight: 500 tons. Length: 42 ft. Rated at 384,000 kva, the unit will be capable of 10 per cent additional capacity when the hydrogen inner cooling gas pressure is increased from the normal 45 psi to 60 psi. Delivery is scheduled for the first half of 1960

Ruhr Eyes French, Swedish, And Japanese Competition

RUHR STEEL mills that were operating at 70 to 75 per cent of capacity in 1958 have been back at 90 per cent capacity most of this year. But with the brighter prospects have come new worries: 1. French competition is keenly felt. 2. It is feared that major steel expansion programs in Sweden and Japan will pinch Ruhr exports.

• **Sweden**—West German steelmakers expect Sweden to meet all its own thick plate demand within two years and to supply all Scandinavia with ship plates by the mid-1960s. The Germans also foresee their domestic market being penetrated by Swedish steel. The Swedes have started an export campaign, though yet on a small scale, by opening export offices in various countries. They are offering boiler plates and steel tubes at 20 to 25 per cent under comparable German stock, say European sources. The loss of Swedish clients alone is a considerable jolt for the Ruhr. Thick and medium plate exports have averaged 235,000 tons annually over the last few years.

• **Japan**—Production of welded and seamless tubing is being undertaken by Japan. Ruhr executives believe it won't be long before the Japanese enter the world tube market on a large scale. They've already encountered competition with rolled products over the last two years. Reason: When China shut off steel imports from Japan, the islanders had to find other markets. Even including transportation costs, prices are competitive with those of European mills.

• **France**—While Swedish and Japanese competition remains primarily in the export market, French competition is hurting on the home front. The Germans say recent improvement in the steel business has prevented the full impact of French competition from being felt at home and in other European Coal & Steel Community nations. French steel is being offered in Germany at an average of 10 per cent below domestic products. Quite a few German firms, including two major automakers, have availed themselves of the savings.

Although much of the competition is blamed on the devaluation of the franc last December, other factors come into play. The Lorraine steel works are close to their ore supplies. Ruhr mills must import most of their ore. French producers outdistanced West Germany in new postwar capital investment per ton of crude steel output. Investment credits obtained by French plants, mainly from public funds, were generally far cheaper than in the Federal Republic of Germany where interest rates declined from extraordinarily high levels only this year. Until recently, French fuel costs were also more favorable.

• **What to Do?**—One faction holds that no drastic adjustment is required. It argues that steel demand will continue to grow and easily absorb future expansion of steel output. Another faction recommends adjustments in the structure and production program of the German steel industry without delay. That group believes the Ruhr should make greater use of cost cutting production techniques and concentrate more on high quality steels.

While the issue is being debated, a number of firms are broadening their economic base by entering new, stronger, and more diversified company groupings and branching out into supplementary steel processing industries.

The postwar period of vigorous expansion appears to be drawing to a close. It is giving way to a period of internal consolidation. Investment funds are being concentrated on modernization of production equipment, prospecting for foreign ore supplies, building company owned cargo vessel fleets, strengthening the overseas sales network, and similar purposes.

ECM Aid Plan Considered

A "Marshall Plan" proposal to launch a long range economic aid program for "less developed" nations in the Free World is being considered by the commission of the European Common Market.

At the May meeting of the Action Committee for the United States of Europe, a policy resolution was adopted which urges a new approach by the European Community to help raise living standards in less developed countries by 25 per cent within the next ten years. A threefold approach was suggested: 1. Recruitment of scientists and technicians to aid in training administrators and economists needed by the countries. 2. Co-operation to stabilize the prices of raw materials in world markets. 3. Encouragement to increase the supply of investment funds to the poorest countries.

A NEW TYPE OFF-THE-ROAD MILITARY VEHICLE, the "Goer," was previewed at Ft. Knox, Ky., by the U. S. Army. The 15 ton machine is capable of operating over rough and muddy terrain and floats across inland waterways. Developed by LeTourneau-Westinghouse Co., Peoria, Ill., the vehicle uses basic standard components in L-W's commercial earth moving equipment line

You Can Use Operations Research

Some areas where industry is using it:

Production scheduling	Accounting
Long range planning	Purchasing
Sales & marketing	Personnel
Inventory control	Advertising
Distribution	Product allocation
Traffic control	Plant location
Research	Plant layout
Finance	Pricing

TEN YEARS AGO the headline on this article would have drawn questioning looks from practically all management men. Five years ago, acceptance would have been confined to some of the giants in industry. Today, large, medium, and small companies are beginning to take a long look at the possibilities operations research offers them.

This problem solving technique (called OR or opsearch), one of the newest available to management, is gaining acceptance for several reasons. First, nothing makes for success like success itself. Second, even though OR practitioners are scarce, they are growing steadily in number, and they are out "preaching the gospel." Third, a good store of literature has been built up. Fourth, as the art develops, it has a tendency to become formulated, meaning that the uninitiated can understand and apply it.

• **Opportunities Increase**—One aspect of OR which hasn't changed much in the last ten years is that it is still time consuming and expensive. Most managers of small, limited-capital companies tend to shy away from it. But their cause is not hopeless. Most opsearchers claim that the number of small clients is increasing at a greater rate than the big ones.

One of the main reasons is the mounting number of colleges and universities offering this service at greatly reduced rates. They're going into OR as a training ground for students and as an opportunity for their faculties to develop methods and techniques of problem solving. (See list, Page 107.)

Fifteen universities do sponsored or case study work for industry; another 15 offer courses for aspiring opsearchers. Many of the students are available for work which they can write up for thesis or dissertation credits.

The chief problem: The company has little control over the type of problem the student will tackle or the amount of time he will put on it. But the approach gives a company the opportunity to witness OR first hand and become familiar with some of its possibilities.

• **Urge Your Association**—Russell L. Ackoff, professor of operations research at Case Institute of Technology, believes that one of the best ways for small companies to get their foot in the OR door is through their associations. "In industries composed of small companies, there are many common problems," he says. He cites the work being done by industry associations in Great Britain.

The National Coal Board issues about 20 OR reports to its members every year. The British Iron & Steel Research Association maintains an OR group of about two dozen persons. The British Rayon Research Association has worked on the problem of expansion vs. replacement of present types of mill equipment.

"There is little, if any, of this being done in the U. S.," says Professor Ackoff. "The main drawback is that such research would have to be done on noncompetitive problems, and OR by its nature is best applied to competitive situations." However, many opsearchers feel that studies could be done effectively in such areas as market research, competition between processes or materials, industry standards, and labor problems.

• **Proper Atmosphere**—William L. Swager, opsearcher at Battelle Memorial Institute, Columbus, Ohio, is convinced that there is one prime requisite before any company, large or small, can use operations research effectively. "Management must be truly research oriented. The only man with whom we can talk about the benefits of OR is the one who knows his operations can be improved and is willing to do something about it. But we can't do much with the executive who wants to do one thing today and another thing tomorrow unless he develops a 'scientific bent'—a knowledge of the interrelationships of his whole operation. It may take another whole generation of management to develop this."

• **How to Get Started**—If the right atmosphere is present, there are half a dozen ways you can get into OR. 1. Encourage your association to participate. Several association executives have told STEEL they feel

they are using the "scientific approach" to some of their marketing problems, but they admit that they are not doing operations research as such.

2. If a university near you offers work in OR, ask it to use your plant as a laboratory for its students. If the project is for thesis or dissertation work, it may cost you nothing, and you may gain a great deal.

3. Ask the university to assign a full-time OR team to your plant for a specific problem. The cost will be perhaps half of what independent consultants charge, but the study may take twice as long.

4. If local universities do not offer OR, approach one with a concrete proposal and ask it to start a program. Most universities have qualified personnel for this work. Officials at Case Institute, which has the largest offering of OR courses in this country, claim this is how they were "forced" into it.

5. Hire consultants from independent organizations or nonprofit institutes such as Battelle. This can be expensive (a typical study can cost $50,000 to $150,000), but consultants work faster than college teams. (A project will probably take three to six months.)

6. Start from within your own organization. This is the hardest method, but opsearchers believe almost any company has at least one person who is qualified. If he is given time and freedom to study operations research methods and techniques, he can develop his own team. (The American Management Association is sponsoring three OR seminars this fall in New York—Oct. 26-28, Nov. 11-13, and Nov. 16-20. The first one, especially, should benefit the company just starting its own program.)

• **Get on the Team**—Opsearchers say that any of the first five approaches can lead to the sixth, and this is desirable. No matter which of the five you choose, you should appoint one of your own men to the team because he knows your company. (One member must have this knowledge.) After working with the team of experts for a year or two, he can become proficient enough to take over and form a company team.

This approach assumes that you

Attention Small Businesses

If you can't afford to maintain your own OR staff or hire outside consultants, you may find help at universities which specialize in the field. While their services are available to any size company, the cost is most attractive to the small firm with limited capital.

UNIVERSITY	CONTACT
Carnegie Tech . . . . Pittsburgh 13, Pa.	Dean, Graduate School of Industrial Administration
Case Tech . . . . . Cleveland 6, Ohio	Dr. E. Leonard Arnoff, Assistant Director, Operations Research Group
Cornell . . . . . Ithaca, N. Y.	Department of Industrial Engineering & Engineering Administration
George Washington . Washington 6, D.C.	Prof. John Kaye, School of Engineering
Georgia Tech . . . . . Atlanta 13, Ga.	Director, School of Industrial Engineering
Johns Hopkins . . . . Baltimore 18, Md.	Dean, School of Engineering
MIT . . . . . Cambridge 39, Mass.	MIT Center for Operations Research, Room 6-218
Ohio State . . . . . Columbus 10, Ohio	Director, Operations Research Group, Engineering Experiment Station
Oklahoma State . . . Stillwater, Okla.	Prof. J. W. Bentley, Head, School of Industrial Engineering & Management
Stanford . . . . . Stanford, Calif.	Prof. Gerald J. Lieberman, Department of Statistics
California . . . . . Berkeley 4, Calif.	Prof. C. West Churchman, School of Business Administration
UCLA . . . . . Los Angeles 24, Calif.	Prof. James R. Jackson, School of Business Administration
Michigan . . . . . Ann Arbor, Mich.	Prof. Wyeth Allen, Chairman, Department of Industrial Engineering, College of Engineering
Pittsburgh . . . . . Pittsburgh 13, Pa.	William B. Kehl, Director, Computation & Data Processing Center
Yale . . . . . New Haven, Conn.	Department of Industrial Administration

What operations research is . . .

Ask a dozen opsearchers what OR is and you'll get a dozen different answers because the discipline is still young and changing. But the description offered by the National Industrial Conference Board Inc. contains the most common elements:

"Operations research is essentially a method of studying the operation of a system or an integrated set of actions through an analytical approach, depending on team or group research. It usually employs the talents of a variety of specialists, utilizes mathematical analysis, seeks underlying principles, and brings in conclusions which indicate the probable results of various courses of action . . . Its most useful application is to complex problems where many factors are involved and where the elements of the problem can be measured and described quantitatively."

intend to make more than spot use of this technique, and most opsearchers feel that is necessary to make it pay off. Because of the over-all view taken in operations research, work on one problem often brings to light others which may be even more important.

• **All-American Manager** — When choosing your company man for the team, look for intellect first. It takes a quick thinker to grasp the techniques of OR in a short time. He should be language conscious because OR has a vocabulary all its own. He should be able to write an intelligent report in terms for a top executive who is not familiar with such OR terminology as queuing, gaming, matrix algebra, or simulation. One of the more desirable characteristics is that he should be people conscious. He should be able to work with and command the respect of all department heads because this work will cross all levels of the organization.

He should be "problem oriented"—be able to recognize, if necessary, that he is working on the wrong problem. ("The right answer to the wrong problem is worse than no answer at all," says Battelle's Mr. Swager.) And your man should have an engineering background if possible, although anyone specializing in any of the sciences, including behavioral science, can do good OR work.

• **Engineering vs. Research**—Such a person will find it fairly easy to adopt the tools being worked out by true operations researchers. Professor Ackoff believes that basic principles, formulas, and models for use by untrained opsearchers will evolve. But he feels that day is at least ten years away. Says Prof. Daniel Howland, operations researcher at Ohio State University: "This will undoubtedly give the busy executive something more to his liking—a 'kit' readymade for his problem. The trend is definitely toward operations engineering rather than operations research. But it will weaken basic OR because most problems are unique and don't fit a formula."

• **Stand Your Ground**—You should not be scared off by some popular notions about operations research. Although it is mathematical in concept, it doesn't necessarily take an expensive computer. "At most, only 20 per cent of today's problems require that type equipment," says Professor Ackoff.

And while many problems take as long as two or three years with costs in five or six figures, yours may not. Battelle recently completed a study for an auto replacement partmaker which required only two manmonths. The manufacturer was considering putting a guarantee on its product. The study, which cost less than $5000, showed it was not advisable and probably saved the company many thousands of dollars.

Your problem may not be so simple. In fact, opsearchers insist that their method is not a cure-all. But it is certainly worth investigation if you are research oriented.

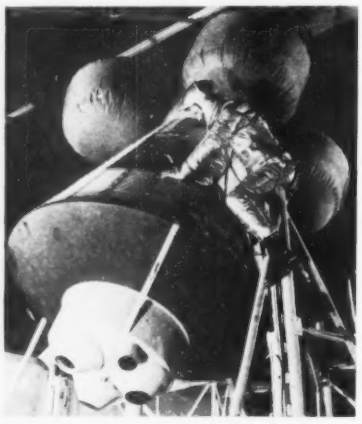
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Tankers to Go Atomic

A design and engineering contract for the study of a nuclear reactor to propel a tanker has been awarded to Combustion Engineering Inc., Windsor, Conn., by the Atomic Energy Commission.

The study, estimated to cost $150,000, is to determine the suitability of a pressurized water reactor as a marine powerplant. Simplicity of design, compactness, and other features contributing to lower capital and operating costs will be emphasized.

Results will be reported by the Commission to the Joint Committee on Atomic Energy on Apr. 1, 1960.



PILOT ENTERS SPACE CAPSULE MODEL. The manned satellite is being built for the National Aeronautics & Space Administration by McDonnell Aircraft Corp., St. Louis. Retrorockets are visible at lower left. Those things that look like big hassocks are flotation bags

Information Experts Needed in Science

"INFORMATION" scientists and researchers, on the same corporate level as technical scientists, are the answer to today's explosion of technical information, says John C. Green, director of the Office of Technical Services, U. S. Department of Commerce.

Speaking before the 15th annual National Electronics Conference in Chicago, Mr. Green pointed out that the Russians are producing abstracts of technical articles published around the world four to seven months after the material originally appeared, and that they are aiming to cut that time lapse to three months.

• **Not Fully Effective** — While we are keeping pace, says Mr. Green, U. S. industry is not yet "mining its information resources" effectively.

Mr. Green said that two sources of information could be exploited more fully. First, he suggests more license arrangements that would permit several companies, large and small, to pool their research findings. Second, he suggests more thorough use of reports being issued by federal government agencies. Mr. Green pointed out that 1000 such reports are issued monthly, and those could represent a tangible return of tax dollars to anyone who would use them.

Funds Go Begging

An agency set up to give exploration assistance to mining operators is attracting few applicants. The Department of the Interior's Office of Mineral Exploration received only 57 applications and entered into eight contracts during the Jan.

1 to June 30 period. The agency's expenditure came to a modest $90,295.

The function of the agency is to enter into contracts with private parties for the exploration of strategic minerals and metals. Government participation is equal to half the cost, not to exceed $250,000 in any single contract.

Interested operators should contact the Department of the Interior, Office of the Secretary, Washington, D. C.

Gas Research to Triple

Research expenditures by the gas industry should more than triple over the next five years to meet increased competition from other fuels, stated J. Theodore Wolfe, president, Baltimore Gas & Electric Co., Baltimore, at the American Gas Association's annual convention in Chicago last week. The industry's co-operative research budget will be $2.5 million in 1960 vs. $1.8 million this year. It is expected to reach $6 million by 1965.

Including outlays by appliance manufacturers and utility companies, total research spending should mount to $15 million by 1965 compared with about $4.8 million now, Mr. Wolfe said. Current activities are directed chiefly at product development and expanding usage.

Mr. Wolfe predicted utility and pipeline companies would serve 45 million customers in 1970 vs. 33 million today. Gas sales will double while population increases one-third in that period, he forecast.

Average for Foremen: $556

A nationwide survey shows that the average monthly salary of a foreman in the U. S. is $556, says Vision Inc., a New York management information service.

Responses to the survey (1418 companies with 33,373 production foremen and 866,874 employees) reveal: Two-thirds of the plants pay between $450 and $650 a month; one-eighth pay less than $450; and one-fifth pay more than $650. Only one firm in a hundred pays an average as high as $10,000 a year.

The average is highest in the West, lowest in the South. The spread is $62 a month. In durable goods manufacturing, the national average is $562. In the West, the average is $585; mid-Atlantic $574; Midwest $564; New England $535; South $521.

$750 Billion GNP Possible in 1970

A $750 BILLION gross national product by 1970 is a real possibility, says David Rockefeller, vice chairman of the Chase Manhattan Bank.

Mr. Rockefeller told a finance conference of the American Management Association that such an increase in the nation's annual production of goods and services is possible with an economic growth of slightly more than 4 per cent annually over the next decade.

"I might point out," he said, "that a growth rate of 4 per cent is greater than our country has normally experienced in the past. Over the last century, lumping good years with bad, our rate of advance has actually been closer to 3 per cent on the average."

• **Key Is Productivity**—Mr. Rockefeller said the key to faster economic growth during the 1960s lies in increased productivity by the individual . . . "a potential in turn which is born of the marriage between science and business management." He added: "I am not suggesting that our economy will take off on a new tack; I am merely assuming that American business will have the ingenuity to continue to move forward in the coming decade as it has since World War II."

He estimated that producers may have the potential for selling 50 per cent more to consumers in 1970 than they sold in 1959, including sales to a large number of new families. "The average family income would rise to more than $8000. Today the average is $6200, half again what it was in the 1930s, even after adjusting for changes in the price level."

HALF OF AN IRON MOLD TO MAKE RUBBER TIRES for off highway equipment is being cleaned at Engineered Castings Div., American Brake Shoe Co., Medina, N. Y. With special techniques to maintain close tolerance and smooth finish, the sand casting will require a minimum of finishing before it is used to mold tires

Missile Makers in Industry

Industry	Employment
Aircraft & Parts	125,600
Ordnance & Accessories	67,400
Electrical Machinery	63,600
Instruments	20,400
Miscellaneous Business	11,300
Government Establishments	8,800
Machinery (except electrical)	4,700
Fabricated Metal Products	4,300
Educational Services	4,200
Chemicals	2,700
Primary Metals	2,300
Transportation	1,600
Misc. Manufacturing	1,100

THE BUREAU of Employment Security of the Labor Department has completed what looks like the first realistic appraisal of the nation's newest and fastest growing industry—missile making.

Surveying 433 establishments in the last quarter of 1958, the Bureau found missile employment to be a shade under 320,000. Almost 40 per cent of the workers were in the aircraft industry. (Total employment in aircraft is over 750,000.) The Bureau found employment in missile making jumped 38 per cent from October, 1957, to October, 1958, and estimates it expanded another 10 per cent by April, 1959. Total aircraft industry employment dropped about 10 per cent from October, 1957, to April, 1959.

California employs about 127,000 workers in the missile industry; New York ranks second employing 24,000. Massachusetts, Washington, North Carolina, New Jersey, Maryland, Michigan, Pennsylvania, and Minnesota each have 10,000 to 16,500 workers. Alabama, Florida, Arizona, Missouri, Colorado, and Texas have 5000 to 10,000 each. San Diego and San Jose, Calif., are the most important missile cities in the country.

Shortages of Skilled Workers Grow

Here is a rundown of manpower shortages in the missile field: Engineers—45 per cent of the missile establishments report shortages. Professional and managerial personnel other than engineers—17 per cent of the aircraft plants making missiles and 7 per cent of the nonaircraft firms report shortages. Skilled workers —42 per cent of the aircraft plants and 27 per cent of the nonaircraft plants have shortages.

The Bureau guesses the shortages are "considerably greater" than they were at the time of the survey.

Mueller Says Highway Program Is O.K.

Commerce Secretary Frederick Mueller reports the federal government's 90 per cent participation (the states pay the other 10 per cent) in the financing of the interstate highway program will continue "without interruption." Apportionments of funds to the states in fiscal 1961 are scheduled to be $1.8 billion. In 1962 they will hit $2 billion.

The money isn't adequate, but more cannot be obtained now because Congress failed to give President Eisenhower his requested 1.5 cent per gallon increase in gasoline taxes (Congress O.K.'d a 1 cent increase). Secretary Mueller sums up the status of the interstate program: "It will continue at a reasonably satisfactory rate."

GSA Offers Zirconium Ore

Continuing to develop the trend toward sale of surplus strategic materials and metals, the General Services Administration will sell 1300 tons of baddeleyite and 7000 tons of zircon sand (zirconium ores). The minimum lot for sale is 120 tons. Sealed bids should be received by the GSA by Nov. 27. For further information, contact GSA's Defense Materials Service, Washington 25, D. C.

Supreme Court to Rule on Union Shop

Employees of the Southern Railroad have challenged the section of the Railway Labor Act under which the International Association of Machinists requires them to join the union to hold their jobs. (The case involves the right of the union to put dues to nonunion uses.)

The Georgia Supreme Court struck down the union shop provision on the grounds that compulsory support of political or economic programs or candidates deprives a worker of his freedom of speech. The U. S. Supreme Court has agreed to review the decision.

Minor Role Cited for Atomic Energy

Bruce C. Netschert of Resources for the Future Inc. told the Joint Economic Subcommittee last week that atomic energy will assume only a minor role as a power source in this country up to 1975. Conventional fuels, he said, will meet our requirements at no appreciable gain in cost (in terms of constant dollars). He predicted hydropower use will increase 120 per cent from 1955 to 1975, natural gas 107 per cent, oil 95 per cent, and bituminous coal 75 per cent. Anthracite coal use will drop 30 per cent. Electricity consumption will advance 210 per cent.

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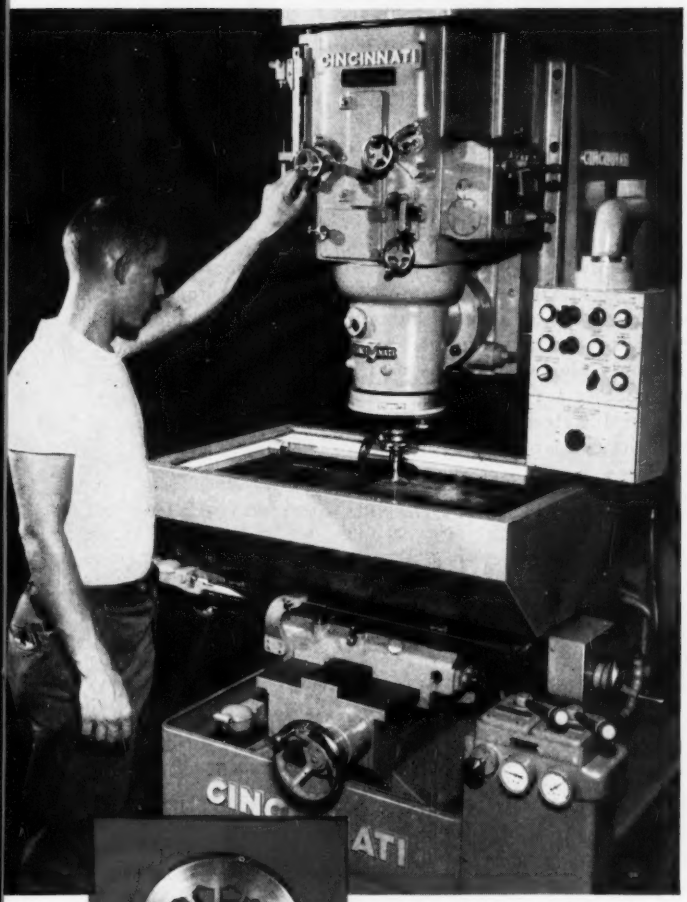
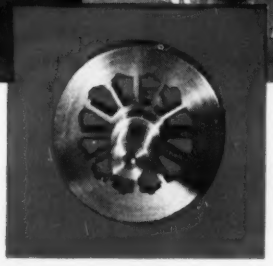
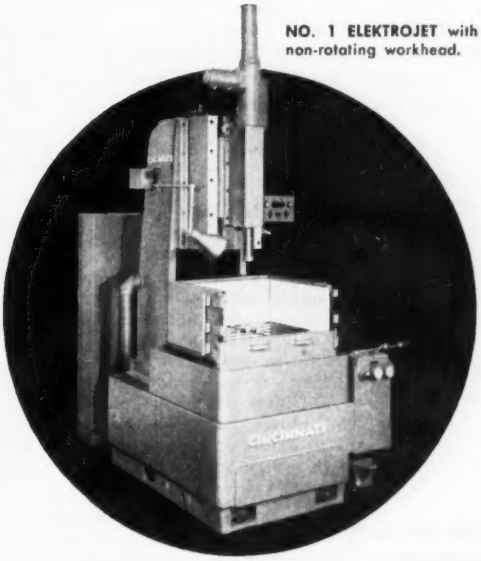
EDM is inherently accurate and Cincinnati's machine tool approach makes sure that the full degree of accuracy is obtained. Another reason for heavy construction is the appreciable force created by electrical discharge machining of large areas. Other Elektrojet advantages include Cincinnati's long experience in hydraulics and servo controls; the Elektrojet customer service laboratory, where you can determine the value of EDM for your work; Elektrojet specialists, who have a machine tool background second to none.

There are 35 variations in the Elektrojet line, covering the requirements of unusual or "impossible" machining operations on a wide variety of parts ranging from small missile components to forging dies. Folder M-2077, containing complete information, will be sent on request. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**





SILENTLY, WITH TOKEN ATTENTION, Elektrojet works quickly and efficiently to perform operations which are impossible or too expensive for other machines. At left is a small missile part of pure beryllium, ⅞" major diameter. In just five minutes twelve triangular-shaped holes are electrical discharge machined simultaneously.



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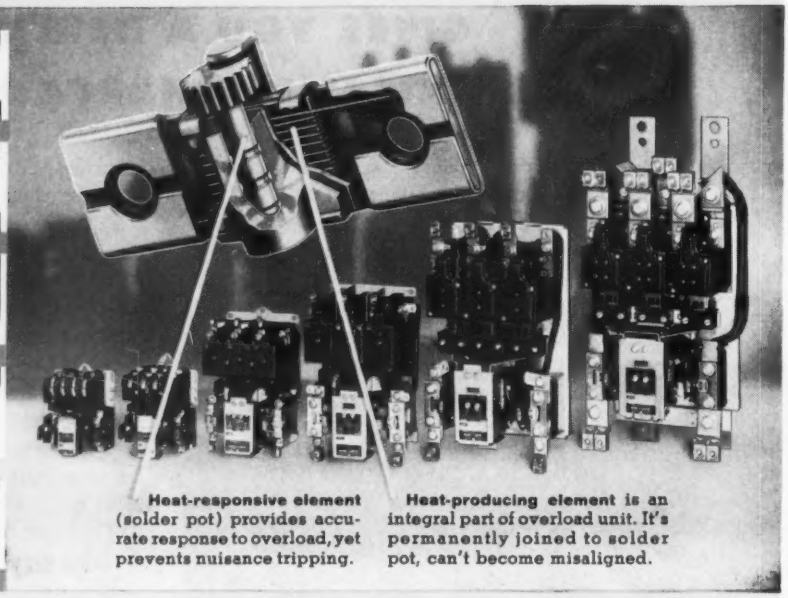
...BE SURE YOU GET IT!



Heat-responsive element (solder pot) provides accurate response to overload, yet prevents nuisance tripping.

Heat-producing element is an integral part of overload unit. It's permanently joined to solder pot, can't become misaligned.

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LET US PROVE IT!

Let your Square D Field Engineer show you **1** how one-piece construction is accomplished and how easy it is to mismatch separate heaters and solder pots— **2** an endurance tester to prove that overload units can be reset repeatedly without damage while the solder is liquid— **3** a tripping time tester to compare various types of melting alloy units and to prove that tripping time won't change after repeated operation.

Write for Bulletin SM-275 for the complete story on Square D starters with ONE-PIECE thermal overload relays. Address Square D Company, 4041 N. Richards St., Milwaukee 12, Wisconsin

SQUARE D COMPANY

Independent Labs, Problem Solvers

in product quality

in air & water pollution

in raw material quality

in production snarls

in corrosion

in plant construction

in new product potential

WERE YOU ready to cry "Uncle" the last time a bug developed in your product line or production process? Chances are, if yours is a relatively small firm, you hit the panic button and lost valuable production time getting rid of it.

Your "Uncle" could be an independent commercial laboratory especially equipped to cure industrial headaches. Perhaps, you should follow the lead of some other firms and make arrangements, before another bug appears, for a lab to answer your cry if you get into trouble again.

Take the case of the swaying ore bridge in a midwestern city not long ago. Engineers noticed movement between top girders and vertical pier members. They reported partial dismantling of the bridge would be necessary to seek out the cause. Operation of the bridge would be halted for several days. Result: A $25,000 loss.

Instead, an independent laboratory licensed by the Atomic Energy Commission was called in to take cobalt 60 radiographic pictures of suspect joints. Defects, which showed up as blurs in the picture, indicated certain loose rivets were at fault. They were replaced, solving the problem.

Such dramatic detective work, however, is only part of the job which independent labs are doing for industry. Other, more routine duties are also the sort which can improve your product, put more profit in your pocket.

• Sample testing of finished products or raw materials can forestall production problems before they arise.

Periodic sample testing, either in the laboratory or on the production floor, is one approach to quality control which a lab can offer you. The Crobaugh Laboratories, Cleveland, run analyses on a daily flow of materials sent in by firms ranging from the smallest fabricator to the country's leading steelmakers. The Crobaugh labs also have engineers on the road to conduct in-plant inspections and to consult with plant managers on product or process problems.

• Major laboratories are uniquely qualified to offer consultation in specific areas.

Herron Testing Laboratories Inc., Cleveland, has a staff of experts qualified in most fields affecting metalworking. Its chemists, physicists, metallurgists, and other technicians have broad industrial experience. David E. Coburn, Herron's director of environmental testing, points out that the impartial status of the independent labs, with no product to sell, is one of their chief assets. They are often called on to act as mediators in disputes between suppliers and customers, to appear as expert witnesses in corporate lawsuits, or to monitor government contract work in a manufacturer's plant.

Although the work of the Crobaugh labs cuts across industry lines, they are especially adapted to the analysis of metals and organic materials. Vice President Morton L. Levy chuckles as he relates how the labs persuaded a gray iron equipment producer to turn out an improved product, in one application, with ductile iron. "There was a difference of only 0.04 per cent magnesium involved, but it was pretty important," he says.

The Herron labs also cover a range of industries, and are specialists in the construction field. Their engineers act as inspectors for the specification and placement of structural steel and concrete; soil foundations; batch plant operation; vitrified and concrete pipe; riveted, bolted, and welded structures.

• Lab costs are keyed to the job you require.

The labs' routine testing work carries a standard rate, determined by the process and time involved. Because of more product familiarity and simplified reporting possible with repetitive jobs, the repeat client is given a lower rate which can cut costs of tests to a few dollars each. More involved jobs or special projects require negotiation of price between laboratory and client.

Mr. Levy suggests many metalworkers might want to investigate these areas: Air and water pollution; raw material quality; identification of contaminants in trace quantities; corrosion problems and auxiliary troubles with contaminated water treatment, lubricant failure.

Most laboratories are not doing product development on a large scale but some may offer product "evaluations" which can be effective in guiding technical developments. More independent labs may branch out into that role.

Uranium Source Grows

Growth of the domestic atomic industry is illustrated by statistics from the U. S. Atomic Energy Commission. Procurement of domestic uranium concentrate (U_3O_8) has risen steadily since 1948. Receipts from domestic sources are expected to equal or exceed foreign receipts in 1960 and 1961.

The procurement statistics for fiscal years are:

	Tons U_3O_8		
	Domestic	**Foreign**	**Total**
1948	110	1,960	2,070
1954	1,450	3,240	4,690
1956	4,200	6,240	10,440
1958	10,250	16,130	26,380
1959	15,160	18,170	33,330

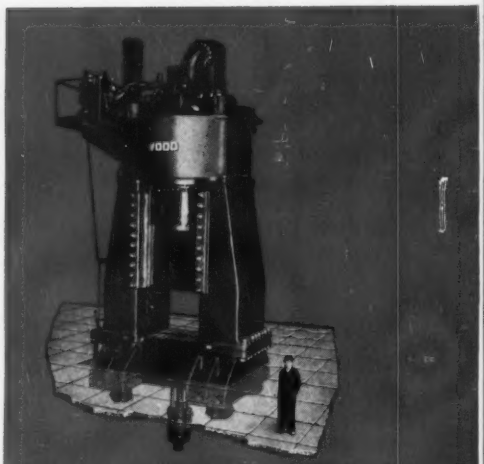
TAKE THE LONG

Plan for tomorrow's needs, today!

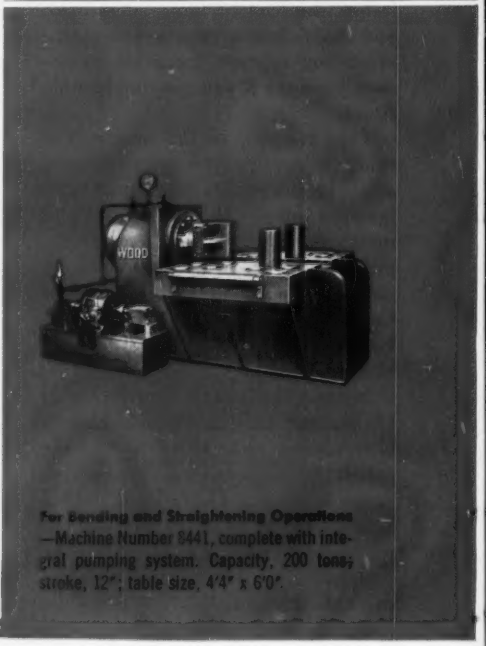
An R. D. Wood Press can be the key to better production capacity needed today . . . and equally efficient capacity in a growing economy in the years to come. In terms of today, you replace worn out equipment, increase production rates and cut excessive downtime. For the long pull, you are in a position to produce top quality products with top operating efficiency and stay on top of heavier production schedules with equipment that can still deliver . . . day, after day, after day.

Check the stamina story of R. D. Wood Presses, today. The long-range sure economy, too. Write for information on the type of press or presses that you require.

The presses illustrated here are representative of the complete line of hydraulic presses and valves produced by R. D. Wood Company. All of those shown are available in various capacities and others are available for different operations. Write to R. D. Wood Company for recommendations on the press to suit your specific problem.



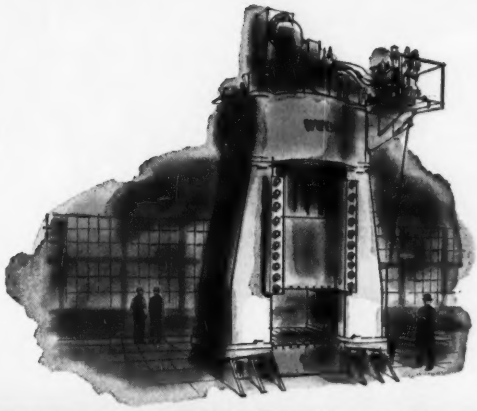
For Forging and Cogging Operations—Machine Number 8439, down-working hydraulic press. Capacity, 3,000 tons; platen size, 4'0"x5'0"; ejector ram, 51 tons; stroke of main ram, 3'0"; height of press, 31'11"; floor space, 9'6"x13'1".

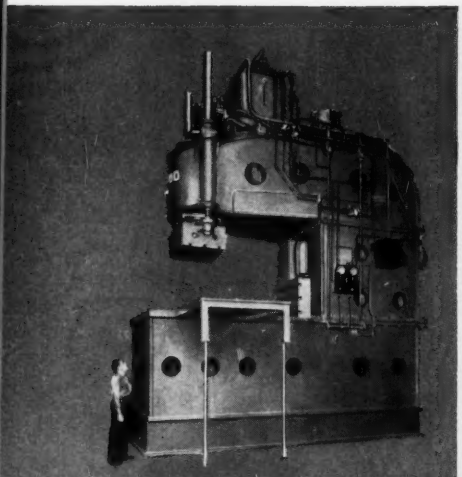


For Bending and Straightening Operations—Machine Number 8441, complete with integral pumping system. Capacity, 200 tons; stroke, 12"; table size, 4'4" x 6'0".

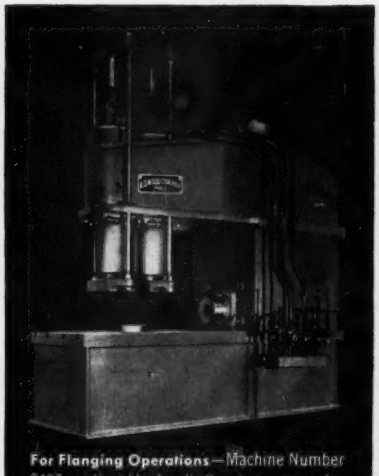
R. D. WOOD COMPANY
PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

LOOK!

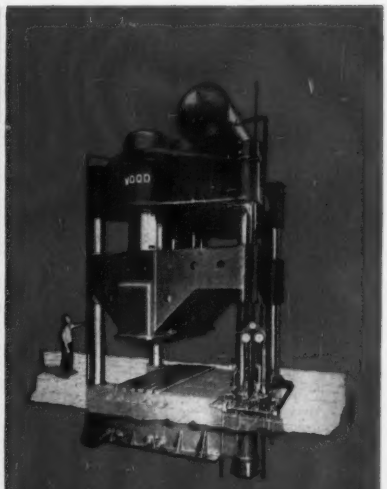




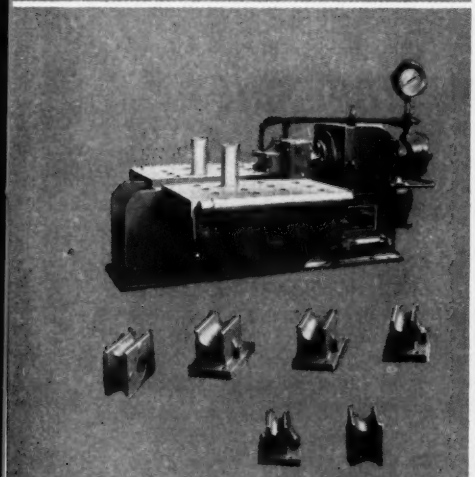
For Straightening Operations—Machine Number 8775, HydroLectric open-gap press. Capacity, vertical ram, 750 tons, horizontal ram, 400 tons; gap, 7'0"; vertical daylight, 4'6"; height of press, 26'5"; floor space, 21'10" x 20'0".



For Flanging Operations—Machine Number 8487, sectional hydraulic flanging press—also for joggling and upsetting operations. Capacity with vertical rams in unison, 300 tons; horizontal ram, 115 tons; stripper ram (in bed), 115 tons; gap, 5'0"; vertical daylight, 3'9"; height of press, 15'9", floor space, 5'0"x14'2".

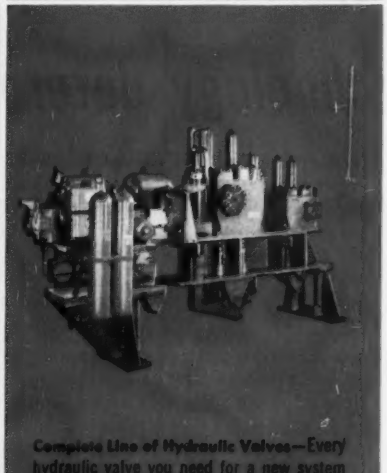


For Bending and Forming Operations—Machine Number 8548, hydraulic press. Capacity, 1,500 tons; moving platen size, 1'10" x14'2"; ram stroke, adjustable, 4'0"; height of press, 29'; floor space, 16'0"x15'6".



For Pipe Bending Operations—Machine Number 9089, horizontal cold-bending press, complete with self-contained pumping system. Capacity, 25 tons; stroke of ram, 11"; table size, 2'8½"x4'2".

For Tube Testing Operations—Machine Number 9284, hydrostatic tube testing machine. Capacity, 4½" to 12" OD tubes, maximum tube length, 35'; test pressure, 700 to 1,500 psi; average production (12" tubes, 35' long), 30 per hour; floor space required, 5'0"x45'0".



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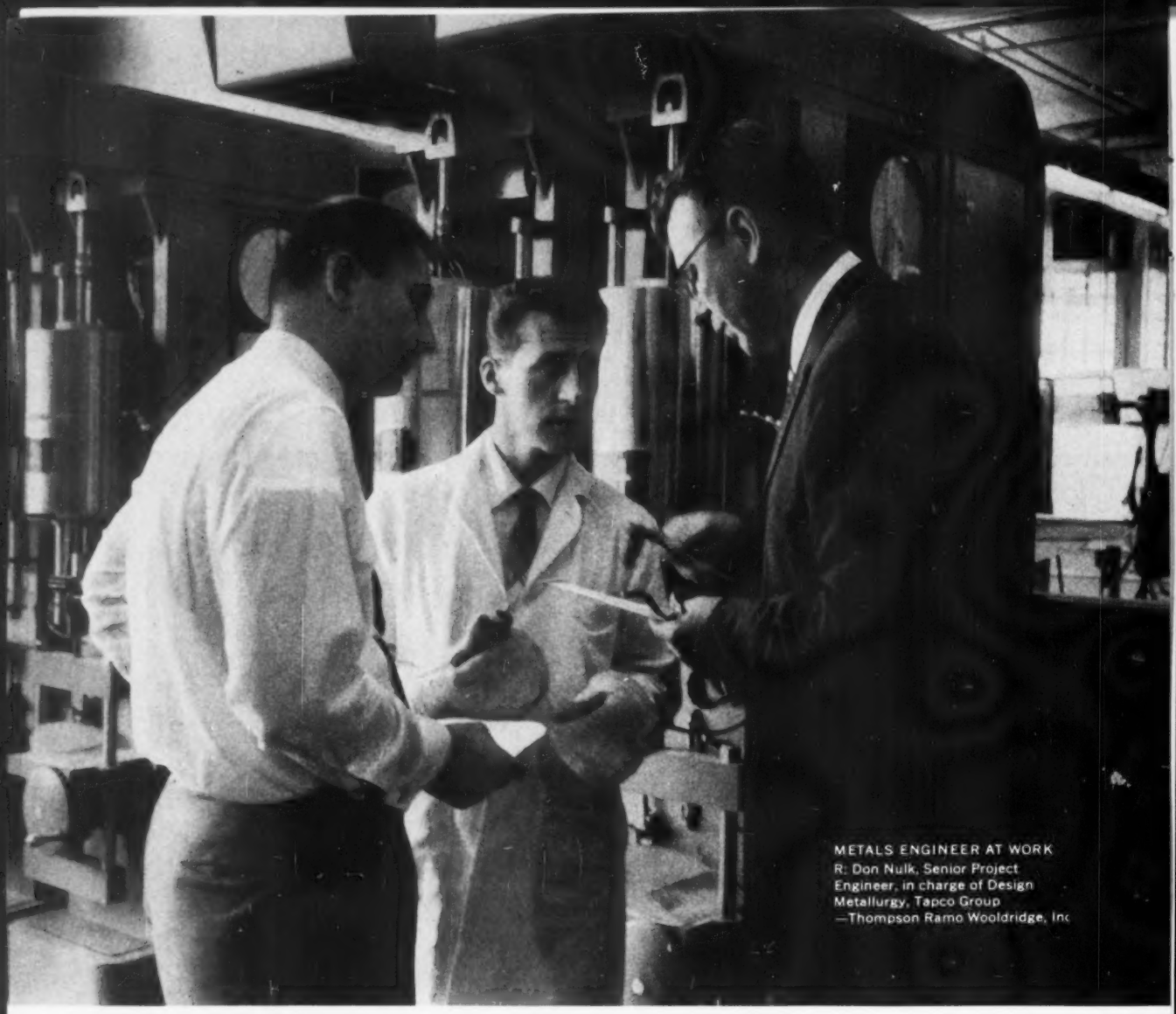

METALS ENGINEER AT WORK
R: Don Nulk, Senior Project Engineer, in charge of Design Metallurgy, Tapco Group
—Thompson Ramo Wooldridge, Inc

technology determines your engineering sales . . .

Let's not emphasize the size of the $140 billion metalworking market. Rather, let's think about *your* product. Let's remember that its inherent purpose – *its engineering advantages and applications* – is most often its basic appeal to metalworking. So isn't it obvious that technical management (technology) must pass upon these engineering features somewhere early in the buying process?

This technical management is often a hidden buying influence that your salesmen can't reach. In metalworking, it may be president or plant manager, metallurgist or materials engineer. We call these people "metals engineers", the *men who care what happens to metals.* They are constantly involved, regardless of title, with the engineering aspects of metalworking. They depend upon Metal Progress, the monthly engineering magazine of their society, the American Society for Metals.

These 30,000 problem-solvers, members of ASM and readers of Metal Progress, deal in fundamentals, however complicated. Will it work or won't it? . . . how well? That's why the advertising pages of Metal Progress are fundamentally important to you for a *complete* advertising approach to the metalworking market.

Metal Progress

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Chrysler Reduces Its 'Waste Line'

IMPERFECTIONS in body sheet steel at Chrysler's Nine Mile stamping plant are being spotted and rejected before the material goes through expensive forming and finishing operations—thanks to a high speed ultrasonic scanner developed by Elton Allan Strohauer, Chrysler's staff methods researcher, and Sperry Products Inc., Danbury, Conn.

Mr. Strohauer spent two years analyzing sound wave theories and selling his ideas to Sperry engineers and Chrysler executives. The reward: Chrysler, and eventually the auto industry, will be able to save several million dollars annually. How: Defective metal will be spotted before it is processed into finished parts like hoods and decks; better steel will reduce die rework and repair; and automakers will have better control over defective vender materials.

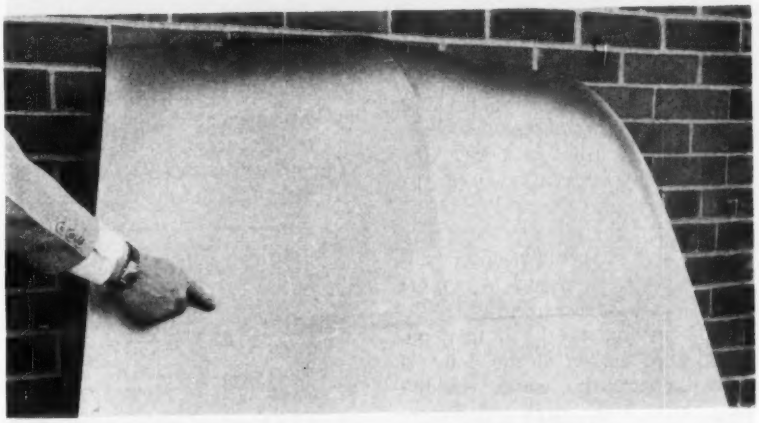
• **Defects Are Problems** — Slivers and splits in cold rolled sheet steel long have been a critical problem for the auto industry. They're caused by slag or other impurities in the metal and often don't show up until the metal is stretched during blanking. Sometimes they don't appear until after parts are assembled. Paint makes the laminations stand out clearly.

Result: Reject rates are high. Chrysler won't say what its experience has been, but some metallurgists indicate that rejects at auto stamping plants can run 30 per cent or higher on a given shipment of steel. (See STEEL, Dec. 22, 1958, p. 22). Usually, the mills allow only a 2 per cent return. Although ultrasonic checking had been considered before, the industry had been unable to come up with equipment that would scan rapidly enough to keep pace with production schedules.

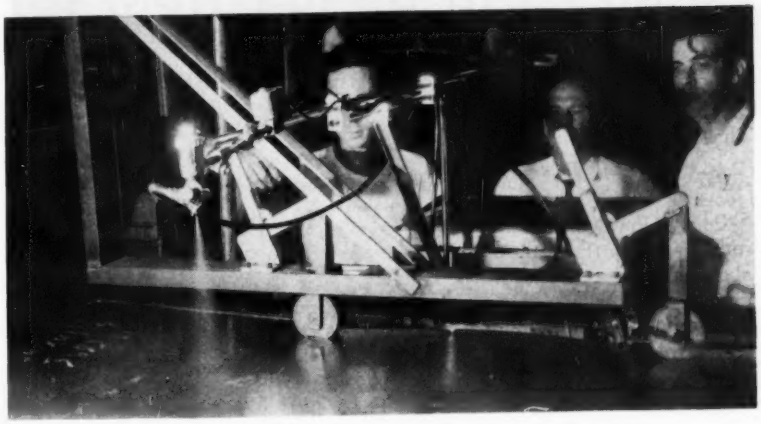
Mr. Strohauer's development enables Chrysler to scan sheet steel at

Researcher Strohauer came up with device . . .

That spots defects in metal before they get this far . . .



High speed makes ultrasonic method practical . . .



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speeds up to 375 fpm. The unit can be integrated into the production line. The present one is just ahead of a blanking press.

• **Scanner Spots Them** — A fairly conventional self-contained scanning unit, developed by Sperry, is used. A special head, 17 in. in diameter, projects from the rear of the equipment cabinet. The head uses two quartz crystals for transmission and pickup of high frequency sound. The crystal probes are set at a 30 degree angle to the steel surface. Mr. Strohauer explains that the angle is critical in getting proper results.

Four Teflon buttons, ½ in. thick, project from the head. They contact the undersurface of the steel as it speeds over the pickup head. A fluid coupling between the head and the steel surface (through which the ultrasonic waves pass) is obtained with a conventional hydraulic fluid in a recirculating system. A centrifugal pump pushes it up through the head and against the steel at a rate of about 3.8 gallons per minute.

• **Coupling Is Key** — Maintaining the fluid coupling without interruption is one of the ways Mr. Strohauer got high scanning speeds. By using a diaphragm and a small sieve device, the oil constantly bubbles up and is spread over the surface of the steel in such a manner that it can't be sucked away by the swiftly moving metal. If this coupling were broken at the point of wave impact, the waves couldn't pass through the steel and bounce back.

To get more speed, Sperry redesigned its electronic system for faster scanning, pickup, and interpretation of the sound waves. Photoelectric cells ahead of the scanner spot ripped and torn sheet edges. The head automatically is retracted so it won't be damaged.

• **Purple Spotter**—A simple paint spray device using purple die is above the sensing unit. As the steel uncoils into the blanker, ultrasonic waves bounce back more quickly when they strike laminations between the head and the opposite edge of the sheet. The shorter impulse automatically triggers the marking unit which sprays a circle of purple die on the metal surface. Inspectors and operators can spot the marked sheets in three subsequent operations.

The rejection of imperfect blanks before they go through the expensive and time consuming operations (drawing, assembly, and finishing) is particularly important to Chrysler this year because of its switch to unitized bodies. Some of the exterior body panels don't reveal defects until the body is assembled. The replacement of panels causes major delays and pushes up costs.

• **Will Work Faster** — Although Chrysler has just put its first scanner in operation, Mr. Strohauer and Sperry engineers are already looking ahead to design improvements. The present unit weighs about 340 lb. Mr. Strohauer believes its weight can be cut one-third. He also aims at reducing the head size to 8 or 9 in. in diameter and upping scanning speeds to 400 fpm.

"I think we'll be able to spot pinholes with almost perfect accuracy shortly," claims Mr. Strohauer. Preliminary tests show the unit can accurately locate laminations as small as 1 in. long and only 20 per cent of the sheet thickness in depth. The scanner works satisfactorily on all cold rolled body sheet steels 0.048 to 0.052 in. thick and 48 to 72 in. wide.

Sperry and Chrysler are working out patent and licensing arrangements for the unit so it can eventually be made available to other auto companies and stamping firms. Prices haven't been set, but the complete scanner should cost around $16,000. Right now, Chrysler is the first and biggest customer. Says Mr. Strohauer: "We have at least 25 outside body parts where quality of steel is extremely vital. We can't afford any rejects because of minor imperfections. That means the stamping division alone will need at least 25 more units to put on the blanker lines for those parts." Ultimately, Chrysler hopes to install the Sperry scanners on all production lines where exterior body steel defects are critical.

Adds Mr. Strohauer: "The next step will be to establish improved quality standards for body steel." Chrysler makes no comment, but it may well be that steel mills will want to take a better look at their own quality control practices. It's likely they'll be seeing more steel coming back from stamping plants as Mr. Strohauer's ultrasonic scanner gains acceptance.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
9 Mo. Totals	4,336,689	2,874,272
October		261,701
November		514,152
December		593,920
Total		4,244,045

Week Ended	1959	1958
Sept. 12	24,364	24,072
Sept. 19	62,716	37,150
Sept. 26	91,341	42,599
Oct. 3	105,720	34,464
Oct. 10	117,101†	34,834
Oct. 17	125,000*	45,387

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Ford Expands Glass Plant

Another 274,000 sq ft of floor space will be added to the 1.16 million sq ft Ford glass plant at Nashville, Tenn. The addition will house a second plate glass melting furnace and a second sheet glass melting furnace. More shipping and storage space will be made available, reports A. R. Wardrop, general manager, Glass Div.

Work on the Tennessee facility will start next month. Completion is scheduled for early 1961. Employment, now 2000, will be boosted 400. The plant turns out over 400 tons of auto glass in some 50 different shapes and sizes daily. Ford began making its own glass in 1919. Today it's the fourth largest glass producer in the country and the third largest maker of plate glass.

The company will also add some 28,000 sq ft to its Dearborn, Mich., glass facilities.

(Photograph courtesy of Proto Tool Co.)

Uniform hardenability . . . prime requirement for high-speed broaching

ARISTOLOY STEELS

The most demanding requirement of steel used in high-speed broaching operations is bar-to-bar and heat-to-heat uniformity. Even slight variations, particularly in hardness, can result in tool breakage, lost production time, and expensive retooling.

By controlled melting in electric furnaces, Copperweld produces a steel of uniform hardenability characteristics. This prime broaching steel, called Protoloy®, is manufactured for Proto Tool Company. Copperweld is willing and able to produce special steels for you to your particular specifications.

For complete information about the full range of Aristoloy A.I.S.I. standard analyses, call the Copperweld representative in your nearest large city . . . or write for NEW PRODUCTS & FACILITIES CATALOG.

COPPERWELD STEEL COMPANY

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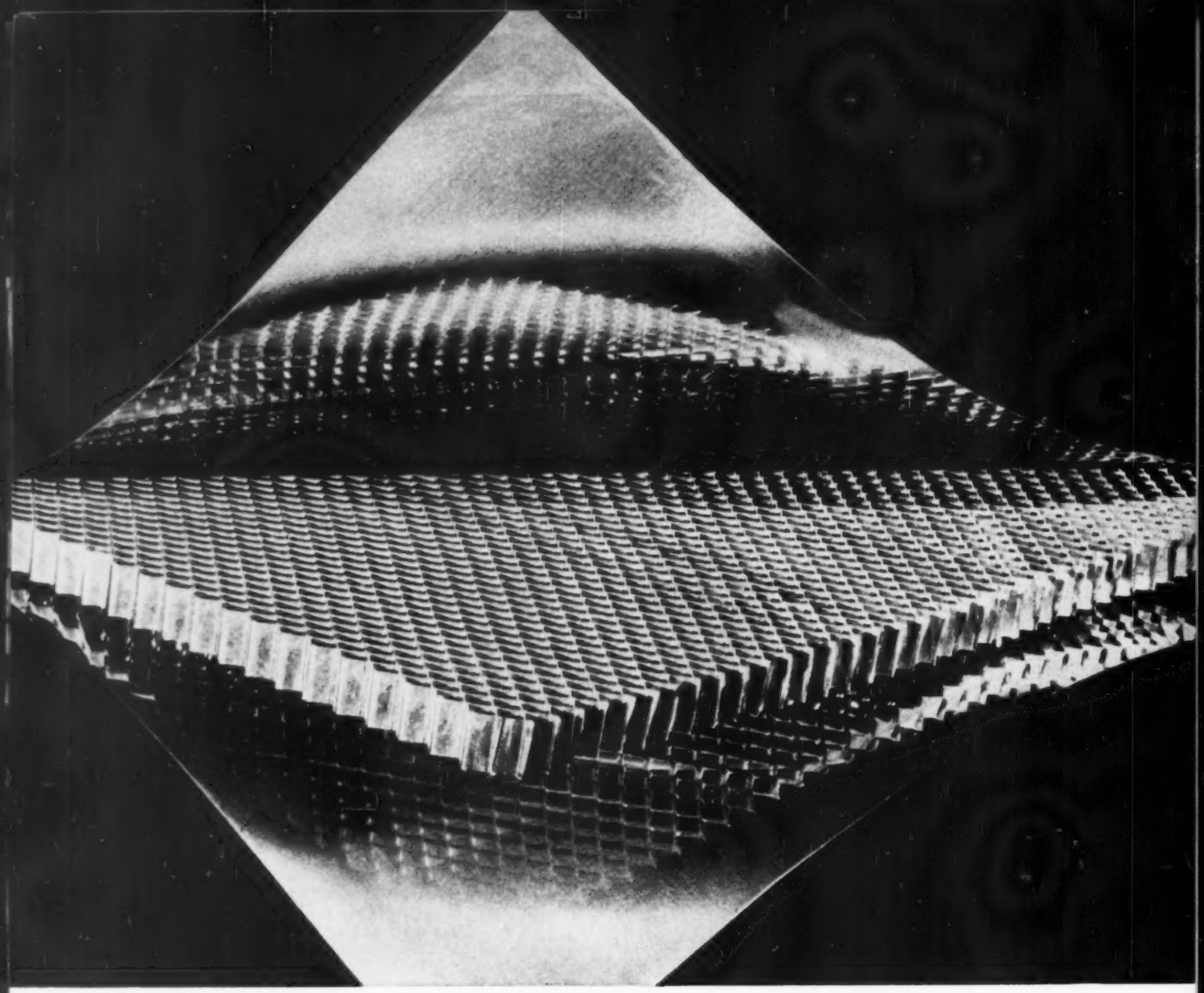

More mileage from Argon in Honeycomb brazing

You can learn a lot about using argon efficiently from the people who make it—Linde Company. This gas is well established as the best atmosphere for honeycomb brazing. Yet some fabricators may be using far greater volumes than they actually need.

This is where LINDE can help in reducing costs. LINDE's "three-phase" concept of argon application includes:

Providing a ready supply of gas to the specifications you require;

Maintaining purity during distribution within your plant;

Getting maximum results from the argon used.

LINDE is uniquely qualified to perform this service because of its extensive work with honeycomb fabricators... and its experience in the production, handling and storage of industrial gases. For aid in the use of argon atmospheres, write Dept. S-104, Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

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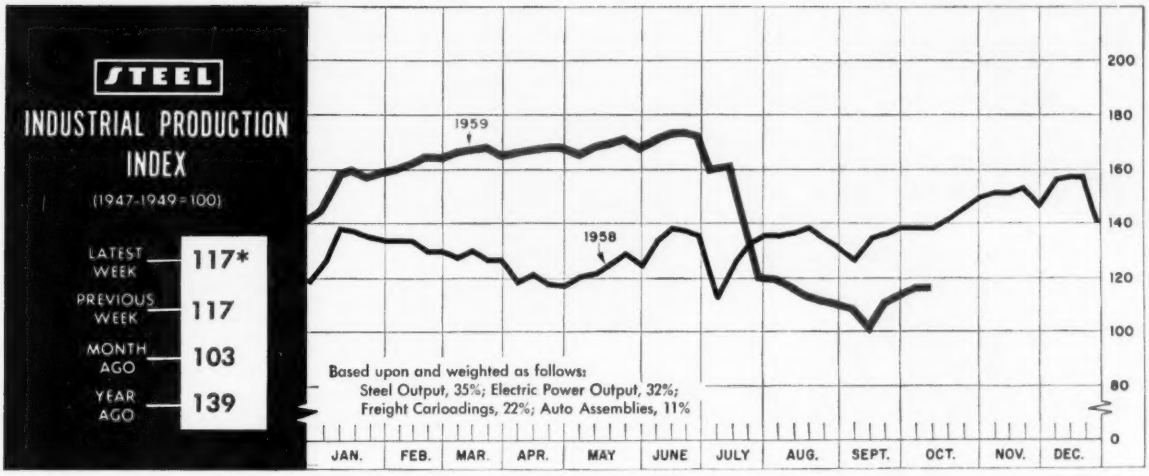


*Week ended Oct. 10.

Indicators to Continue Downtrend

DESPITE the impending return of full-time steel production, don't expect the general tone of business conditions to change overnight. Too much damage has been done by the three-month strike to repair it in much less than a month or six weeks.

A tabulation of the business statistics published in chart form at intervals on the following two pages gives an indication of the extent of that damage. Of the 18 covering shipments and production, eight have turned down since the beginning of the steel strike; nine have continued moving upward (although at a slow rate); and one is about equal to the prestrike level. Several of the "downs" are seasonal and cannot be blamed on the strike.

• **Future Not So Bright**—The most serious trouble has come in new orders and sales. Of the 12 indicators in this category, only two have continued upward since July, while the remaining ten have turned down—significantly in some cases. Practically none of the losses can be blamed on seasonal influences. Partial proof: The graph on Page 122 showing the trend of new orders in durable goods.

In some cases, such as railroad freight car ordering, there is no question about the direct influence of the steel strike. With others, such as machine tool purchases (see graph, Page 122) it is a matter of conjecture. But there is mounting evidence that many such purchases have been delayed until buyers are more certain about supplies of steel and other metals.

• **Backlogs to Dwindle** — Unless some of those orders are placed before the end of the year, many manufacturers' backlogs are going to get pretty thin, even with production scaled down by metal shortages.

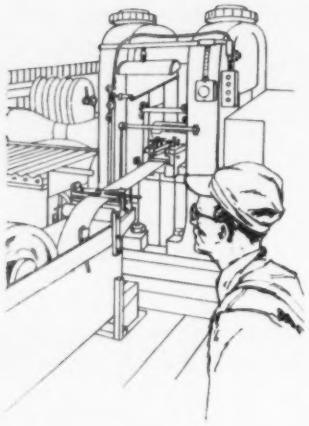
For some time, concern about backlogs has been growing. They have not been building up as they did in the last two business booms

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	368[1]	362	2,003
Electric Power Distributed (million kw-hr)	13,000[1]	13,234	12,067
Bituminous Coal Output (1,000 tons)	7,655[1]	7,690	8,663
Crude Oil Production (daily avg—1,000 bbl)	6,830[1]	6,825	6,874
Construction Volume (*ENR*—millions)	$241.5	$408.4	$353.1
Auto, Truck Output, U. S., Canada (*Ward's*)	147,303[1]	132,945	51,964
TRADE			
Freight Carloadings (1,000 Cars)	575[1]	573	686
Business Failures (Dun & Bradstreet)	224	282	301
Currency in Circulation (millions)[3]	$31,933	$31,809	$31,352
Dept. Store Sales (changes from year ago)[3]	−2%	+7%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,147	$22,118	$21,906
Federal Gross Debt (billions)	$288.0	$288.7	$276.5
Bond Volume, NYSE (millions)	$27,520	$31,419	$30,098
Stocks Sales, NYSE (thousands of shares)	11,863	13,639	19,105
Loans and Investments (billions)[4]	$104.3	$104.6	$93.6
U. S. Govt. Obligations Held (billions)[4]	$28.1	$28.4	$31.4
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247 82	246.65
STEEL's Nonferrous Metal Price Index[6]	225.3	225.5	208.9
All Commodities[7]	119.1	119.2	118.8
Commodities Other than Farm & Foods[7]	128.4	128.4	126.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WHAT'S
DIFFERENT
ABOUT
BRMCO



BRMCO BRONZE, an alternate for phosphor bronze with similar characteristics, is a cold workable alloy noted for its toughness, ductility, uniform quality, high tensile strength, and high electrical and thermal conductivity.

BRMCO developed this special high quality, inexpensive copper base alloy with a leading electrical manufacturer, and has supplied it to many major electrical and electronic manufacturers.

BRMCO BRONZE is also used where spring quality, corrosive resistance, strength and uniformity are prime considerations—for fuse clips, hardware items, springs, plating racks, blade switches, electrical contacts, outlets, circuit breakers and others.

For better products and lower metal working costs, try BRMCO BRONZE.

We'll be happy to send you samples for your own testing and analysis. Simply write, or call collect.

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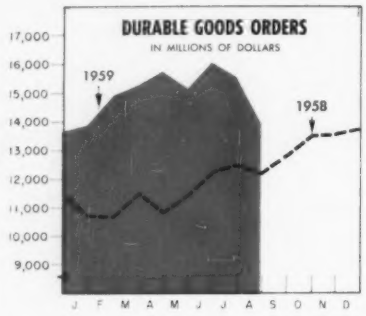
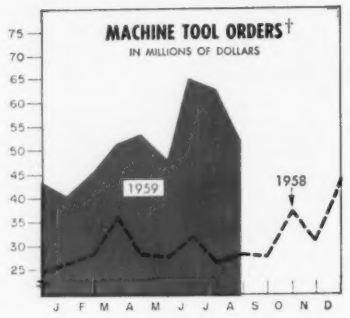
FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

THE BUSINESS TREND



	New Orders* 1959	New Orders* 1958	Sales* 1959	Sales* 1958
Jan.	13,900	10,704	13,541	12,646
Feb.	14,918	10,688	13,870	12,038
Mar.	15,323	11,488	14,400	11,670
Apr.	15,796	10,833	15,166	11,532
May	15,241	11,423	15,515	11,643
June	16,133	12,245	15,771	12,086
July	15,493	12,512	15,384	12,256
Aug.	14,005	12,177	13,975	12,385
Sept.	.....	12,859	.....	12,723
Oct.	.....	13,530	.....	12,943
Nov.	.....	13,574	.....	13,295
Dec.	.....	13,673	.....	13,613

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1959, STEEL.



	New Orders 1959	New Orders 1958	Shipments 1959	Shipments 1958
Jan.	41,050	26,850	31,300	57,800
Feb.	45,400	28,300	36,050	48,050
Mar.	51,550	36,150	45,750	54,150
Apr.	53,200	28,300	45,000	50,900
May	48,700	28,050	41,000	50,100
June	65,400	32,100	50,050	45,500
July	63,400	26,550	40,600	29,700
Aug.	52,400*	28,300	40,400*	29,800
Sept.	.....	28,100	.....	34,900
Oct.	.....	37,000	.....	41,400
Nov.	.....	30,700	.....	33,650
Dec.	.....	43,900	.....	43,950
Totals	.....	374,300	.....	519,900

†Metal cutting and metal forming.
*Preliminary.
National Machine Tool Builders' Assn.

because capacity in most industries is sufficient to meet accelerated demand. In August, the durables backlog stood at $47.4 billion, a little more than 9 per cent above the low point of the latest cycle. In the corresponding phase of the previous buildup (in 1955), the increase was a little over 14 per cent. While there is the distinct possibility that the economy has entered a period of quick delivery-low backlogs, it leaves manufacturers much more vulnerable than they have been in the last few years to production cutbacks due to temporary shortages or other lulls.

• **New Orders Coming?**—The 80 day cooling off period facing the steel strikers may help to jar loose some of those delayed orders. But if it doesn't the possibility of another strike may not be the biggest short term problem facing some manufacturers.

Buyers See More Trouble

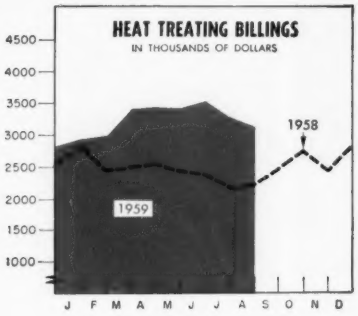
Purchasing agents feel the strike has lasted too long to avoid serious dislocations in production, reports the National Association of Purchasing Agents. They say that even with a period of full steel production, there will continue to be cutbacks in production of fabricated steel items for some time.

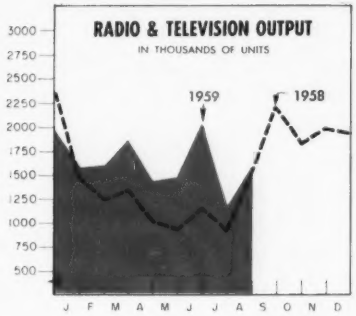
Twenty-nine per cent of the reporting members of the Chicago association say they have enough steel to maintain present operations for 30 days from the date of the latest survey (early October). Assuming that the mills begin to operate yet this week, those members are still going to have trouble. Some steel will begin to flow through the pipelines within two weeks, but significant shipments won't be made until well into November.

Another 51 per cent of the Chicago purchasing agents have enough steel to hold out for 60 days. If imbalance doesn't stop them, they may be in fairly good shape. But the only ones who seem safe now are the remaining 20 per cent who claim to have enough steel to last 90 days or longer.

Delayed Reaction on Index

Even a small increase in steelmaking in the first couple of weeks after the resumption of work will have a favorable effect on STEEL's industrial production index, but it will be early November before the trend line looks like it is scaling the





	1959	1958	1957
Jan.	2,915.5	2,825.5	3,533.9
Feb.	2,976.0	2,466.3	3,378.9
Mar.	3,397.3	2,490.5	3,631.8
Apr.	3,420.6	2,538.0	3,572.4
May	3,405.6	2,421.5	3,389.6
June	3,518.5	2,367.3	2,912.1
July	3,259.7	2,141.5	2,767.5
Aug.	3,111.3	2,212.9	2,830.8
Sept.	.....	2,457.1	2,765.0
Oct.	.....	2,744.9	3,076.2
Nov.	.....	2,422.0	2,677.2
Dec.	.....	2,799.4	2,579.3

Metal Treating Institute.

	Radio		Television	
	1959	1958	1959	1958
Jan.	1,125	1,026	437	434
Feb.	1,125	877	459	370
Mar.	1,348	931	494	417
Apr.	1,040	630	389	303
May	1,040	655	432	267
June	1,430	774	571	337
July	829	593	350	275
Aug.	1,009	981	547	507
Sept.	....	1,572	...	622
Oct.	....	1,322	...	496
Nov.	....	1,546	...	438
Dec.	...	1,526	...	415
Totals	....	12,481	...	4,921

Electronic Industries Association.

other side of the valley.

Since the strike period low of 103 (1947-49 = 100) was reached during the Labor Day week, the index has crawled up to a preliminary 117 for the week ended Oct. 10. Of the 14 point gain, 8 points have been added by new model buildup in the auto industry. Warm weather through the first part of October boosted consumption of electricity, adding another 4 points, and improved freight carloadings took care of the rest.

Auto producers have had to cut back their October schedules and may end up with only 50 to 60 per cent of their goal, says *Ward's Automotive Reports*. They may have to cut back even farther before they start getting steel again. This would restrict the early advances of the trend line.

Enough Money for a Boom

Once the steel situation is settled and 1960 goes on to the record heights expected of it, the question might be: Will there be adequate financing to support the boom?

"Yes," replies James Dawson, vice president and economist of Cleveland's National City Bank. Here's how he sees the demand-supply picture for funds in 1960:

Demand	(billions)
From corporations	$17.5
Mortgages	15.0
Consumers	5.5
State & local issues	8.0
Federal cash deficit	−2.0
Total	$44.0
Supply	(billions)
Savings accounts	$13.0
Personal investment in securities & mortgages	10.0
Insurance reserves	13.0
Misc. & residual	9.0
Total	$45.0

"Such prospects are not inconsistent with a Federal Reserve policy designed to limit borrowing to a volume which will permit prosperity, yet avoid inflation," Mr. Dawson declares.

Edwin B. Moran, executive vice president of the National Association of Credit Management, takes issue with that viewpoint. He says: "Many borrowers may have to be content with smaller loans than desired for there just isn't enough lendable money to satisfy total demand." He feels that a rather severe credit stringency appears to building up, similar to boom-ending experiences of the past.

How to maintain working-level inventories

Storing extra stocks of fasteners is expensive and space consuming. Screw and Bolt Corporation makes it possible for you to end inefficient, costly overbuying and maintain properly balanced inventories. Nationally situated plants, distributors and warehouses stand ready to supply you from existing stocks, when you need them. If it's specials you want, our experienced designers can quickly come up with the answer. Remember, only one order from this one source can fill your every fastener requirement. VMA 6779

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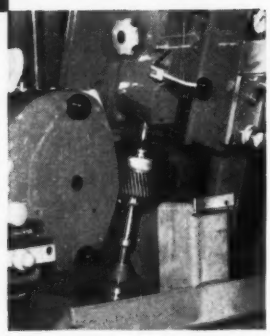
America's Most Complete Line of Industrial Fasteners

LOW-COST WAY to Quieter Gears



Gears for a well-known line of industrial mixers are ground to runout tolerance of 0.0005" T.I.R. at high speed and low cost.

Finishing power transmission gears to tolerances measured in "tenths" used to be costly. But not any more: they can now be ground on the No. 12 Fellows-Reishauer Gear Grinding Machine which combines low-cost, high-speed operation with outstanding accuracy. As a result, these heavy-duty industrial mixers now run more smoothly and efficiently than was ever possible before.

The Fellows-Reishauer is built in America by Fellows, under a license from Switzerland's Reishauer Tool Works, Ltd. Fast and simple to set up, it permits economical grinding of single gears as well as long production runs. Capacities are 12" outside diameter for both spur and helical gears; 6¾" face width for spurs. Max. face width for helicals depends on pitch and helix angle.

Fellows gear production and inspection equipment can probably help you lower your gear production costs, whatever your requirements. The complete line, for gears from 1/16" to 120" P.D., includes Fellows Gear Shapers, Pfauter Gear Hobbers and Fellows-Reishauer Gear Grinders as well as a number of other more specialized machines. For full information, get in touch with any Fellows office.

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THE PRECISION LINE

Fellows *Gear Production Equipment*

ALBERT O'B. ANDREWS
heads American-Standard div.

DONALD M. PATTISON
president of Boggis Co.

W. THOMAS GETTIG
LFM v. p.-gen. mgr.

RICHARD E. SALISBURY
Calumet Steel sales post

Albert O'B. Andrews was appointed president, **American-Standard Industrial Div.**, Detroit, formed last January through merger of three divisions of American Radiator & Standard Sanitary Corp. Mr. Andrews succeeds **John W. Brennan**, who will engage in engineering and development of the corporation's air conditioning and related product lines, with particular emphasis on expansion in overseas markets served by American-Standard.

J. Ernest Hinzman was made manager-research and development, **Vulcan-Kidd Steel Div.**, H. K. Porter Company Inc., Aliquippa, Pa. He was production manager at the Kidd Works.

S. S. Podnos was made general manager, **USI Robodyne Div.**, New York, U. S. Industries Inc.

Michigan Tectronics Inc., Detroit, appointed **Harry Bill Jr.** vice president-sales, responsible for field operations of the Engineering and Manufacturing Divisions.

Raymond C. Chenoweth was named purchasing agent, Ohio Div., Dayton, Ohio, **Associated Spring Corp.**

United - Greenfield Corp. elected **Woodrow Tichy** a vice president. He continues as general manager, **Whitman & Barnes Div.**, Plymouth, Mich. **Milton P. Bradley** was made factory manager at Whitman & Barnes. He was superintendent of finishing at **J. H. Williams & Co.**, Buffalo, another U-G division, and is succeeded by **John F. Schleifer.**

Donald M. Pattison was elected president of **Henry P. Boggis & Co.**, Cleveland. He was vice president, Motch & Merryweather Machinery Co. **Henry P. Boggis** begins a long-planned program of gradual retirement, through which he retains active engineering interest in the Hybco tap grinder which he developed 22 years ago.

W. Thomas Gettig was named vice president-general manager, **LFM Mfg. Co.**, Atchison, Kans., subsidiary of Rockwell Mfg. Co. He was assistant to the vice president of Rockwell's Meter & Valve Div.

Cooper Alloy Corp., Hillside, N. J., appointed **Stuart F. Cooper** sales manager, Vanton Pump & Equipment Corp. Division, to succeed **Gerald Lewis**, recently made chief engineer. **Harold W. Rimalover** succeeds Mr. Cooper as sales manager, Foundry Products Div. **William G. Crook Jr.** replaces Mr. Rimalover as sales engineer, Foundry Products Div.

H. W. Rainey Jr. was made general sales manager, **Sturtevant Div.**, Hyde Park, Mass., Westinghouse Electric Corp. He was field sales manager.

Richard J. Sargent, vice president, **Westinghouse Electric Corp.**, Pittsburgh, was named to head a newly formed Portable Appliance Div. **O. H. Yoxsimer** was made general manager, Television-Radio Div. at Metuchen, N. J., and **Richard S. Sheetz** was made general manager of the East Springfield, Mass., appliance plant to succeed Mr. Yoxsimer.

Richard E. Salisbury was made manager-merchant bar sales, **Calumet Steel Div.**, Borg-Warner Corp., Chicago. He heads a newly created division of the General Sales Dept.

John R. Covington, former secretary, fills the new post of administrative vice president of **Oliver Corp.**, Chicago. **Donald W. Alfvin** was elected secretary. **Donald W. Koegle**, former vice president-general sales manager, was made vice president-marketing, a new post.

C. T. Fletcher was made chief metallurgist, **Braeburn Alloy Steel Corp.**, Braeburn, Pa. He replaces **John A. Nelson**, retired.

E. Henry Holm was named manager-marketing research, **Latrobe Steel Co.**, Latrobe, Pa. He was senior market analyst at Lukens Steel Co.

B. P. Gibbons was made vice president-sales, **Altamil Corp.**, El Segundo, Calif. He was with Convair Div., General Dynamics Corp. as manager of materiel.

William J. Pohl Jr. was made administrative assistant to the director, production planning programs, **Jones & Laughlin Steel Corp.**, Pittsburgh.

Walter J. Prochak succeeds **Floyd Hoskinson**, retired, as superintendent, Cold Drawn Bar Dept., of Youngstown Sheet & Tube Co.'s Brier Hill plant, Youngstown. **J. Paul Tierney** succeeds the late **Joseph Williams** as superintendent

ELMER A. RICH III
Lake Erie Machinery v. p.

RUSSEL T. DRENNAN
Kaiser div. sales dir.

JOSEPH G. SOLARI
Great Lakes Carbon sales

MAURICE J. DAY
Crucible Steel v. p.-commercial

of the Struthers, Ohio, plant's Rod, Wire and Conduit Departments.

Elmer A. Rich III, former general sales manager of **Wheelabrator Corp.,** Mishawaka, Ind., was named vice president-general manager of its recently acquired subsidiary, **Lake Erie Machinery Corp.,** Buffalo. **George O. Pfaff** was made marketing director of Wheelabrator. **John M. Wolf** was made treasurer of Lake Erie in addition to his post as controller of Wheelabrator. **J. F. Connaughton,** Wheelabrator president, also serves as president of the subsidiary. **Robert E. Dillon,** who was president of Lake Erie Machinery, is now chairman of the company's executive committee and serves in a consulting capacity to Mr. Connaughton.

Carl Decina was named plant superintendent by **Rolle Mfg. Co. Inc.,** Lansdale, Pa. From 1940 to 1958, he was a general supervisor at the Buffalo plant of Aluminum Co. of America, and more recently was plant superintendent for Superior Bearing Co., Buffalo.

Russel T. Drennan was made director of sales, **Kaiser Refractories & Chemicals Div.,** Kaiser Aluminum & Chemical Corp., Oakland, Calif. **Eugene C. Tinsley** was made director of marketing. The appointments follow the recent merger of Mexico Refractories Co., Mexico, Mo., and Kaiser Aluminum & Chemical Corp.

Joseph G. Solari was made vice president-sales, Carbon Div., **Great Lakes Carbon Corp.,** New York. He was vice president of Sterling Precision Corp.

George B. Howell was named vice president-manufacturing for all divisions of **Leece-Neville Co.,** Cleveland. **Albert F. Goodrich** was named comptroller.

Charles V. O'Hara was appointed president, **Connor Spring Mfg. Co.,** Los Angeles, to succeed the late **Gustav A. Schwarz.** Mr. O'Hara was San Francisco Div. manager. **Marshall W. Christen,** Los Angeles Div. manager, was appointed vice president.

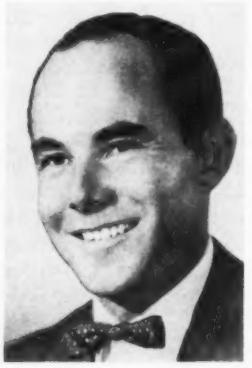
Maurice J. Day, former vice president-technology, **Crucible Steel Co. of America,** Pittsburgh, was named to the new post of vice president-commercial in an expansion of its sales organization. **Walter E. Gregg** succeeds Mr. Day as head of the Technology Dept. with the title of director of technology. He also continues as director, Technical Development Div. Mr. Day has full responsibility for sales management. **Geo. W. Stamm,** vice president-sales, continues in that post with executive responsibility for trade and commercial relations and sales policy planning and promotion.

At a meeting of the board of Anaconda Co. it was announced that **John A. Coe** will become vice president with headquarters in New York, but will continue as chairman of **American Brass Co.,** Waterbury, Conn., a subsidiary. **Richard M. Stewart,** president of American Brass, will in addition become chief executive officer of that subsidiary.

Robert N. Kolb was named labor

CARL DECINA
Rolle Mfg. plant supt.

GEORGE B. HOWELL
Leece-Neville v. p.-mfg.



CHARLES V. O'HARA
Connor Spring president

JOHN A. COE
Anaconda v. p.

when the pressure is on you need PEN-O-LED® EP

When production is up, a breakdown can be dangerously costly. Maintenance costs compounded with lost orders add up big in the profit squeeze. That's why in important places—such as gear drives subject to high pressures—you need Pen-O-Led EP, for protection against wear and costly down-time.

Pen-O-Led lubricants' extreme pressure and oiliness additives give you positive protection against friction and film rupture under the highest load conditions. They provide an ample margin of protection under shock loads, periods of peak overloads, and help prevent welding of gear teeth. Pen-O-Led EP is available in eight job-matched viscosity grades for gears, plain and anti-friction bearings, speed reducers, worm gears, screwdowns . . . wherever working loads exceed 1000 lbs. per lineal inch of gear tooth face.

For longer service life and lower maintenance costs—specify Pen-O-Led EP. For more information, call your nearest Esso office, or write: Industrial Lubricants Division, Esso Standard Oil Company, 15 West 51st Street, New York 19, New York.

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KEITH A. HILL
Besly-Welles chief eng.

GEORGE H. LOCKWOOD
Heald research-dev. mgr.

ROBERT G. VANCE
Elwell-Parker eng. post

JOHN K. STEWART
Air Products div. post

WILLIAM H. SCHWEIKERT
joins Precision Castparts

RAY G. HOLT
heads new Fawick div.

relations manager, **Latrobe Steel Co.**, Latrobe, Pa.

John K. Stewart was made general sales manager and **Jack W. Blanton** was made Allegheny, Pa., regional manager of **Air Products Inc.'s** new Industrial Gas Div., recently formed to merge separate marketing operations of steel mill sales and cylinder gas groups.

William H. Schweikert joined **Precision Castparts Corp.**, Portland, Oreg., as technical director. He was with General Electric Co.'s Aircraft Gas Turbine Div., Cincinnati, where he supervised fabrication applications-metallurgy.

C. F. Anderson was made general manager, **Page-Hersey Tubes Ltd.**, Toronto, Ont. Former executive vice president and assistant general manager, he continues as executive vice president.

A. C. Broholm was made assistant manager-sales, Wire Div., Chicago, **Republic Steel Corp.**

Ray G. Holt was named manager of a new Hydraulic-Electronic Div. of **Fawick Corp.**, Cleveland, a development following acquisition by Fawick of New Products Corp., Skokie, Ill. Development activities and limited production continue at Skokie until Nov. 1 when key personnel and equipment will be transferred to Cleveland. **Oscar H. Banker**, former president of New Products, continues as director of research and development of the new Fawick division.

W. L. Dykhuizen was appointed manager, Omaha, Nebr., branch sales office, **Aluminum Co. of America**. He succeeds **R. P. Black Jr.**, who transfers to Atlanta as assistant district sales manager. **Comer B. Thompson** was made manager of the new branch sales office in Oakland, Calif. **Harold A. Faisst** was made manager, Philadelphia district sales office, succeeding **S. J. Simmons Jr.**, recently made general manager of Alcoa's Development Div., with headquarters in Pittsburgh.

Keith A. Hill was appointed chief engineer of new product development for **Besly-Welles Corp.**, South Beloit, Ill. He has been with Besly since 1949.

George H. Lockwood was made manager of development and research, **Heald Machine Co.**, Worcester, Mass. He was in charge of special projects. He also specialized in machine design and electronics.

Robert G. Vance was named chief development engineer, **Elwell-Parker Electric Co.**, Cleveland. He was design engineer and chief draftsman.

Robert O. Lotspeich was made works manager, **Witt Cornice Co.**, Cincinnati. **Stuart J. Swensson,** former general sales manager, was appointed vice president, continuing in the sales post, and with new duties concerned with company administration.

Joseph E. Jenkins was made marketing manager, DataTape products, **Consolidated Electrodynamics Corp.**, Pasadena, Calif.

Frank P. Kelly was made manager-manufacturing operations, **Brown Instruments Div.**, Philadelphia, Minneapolis-Honeywell Regulator Co. He succeeds **Frank M. Rea,** assigned to Honeywell's Industrial Products Group as a consultant.

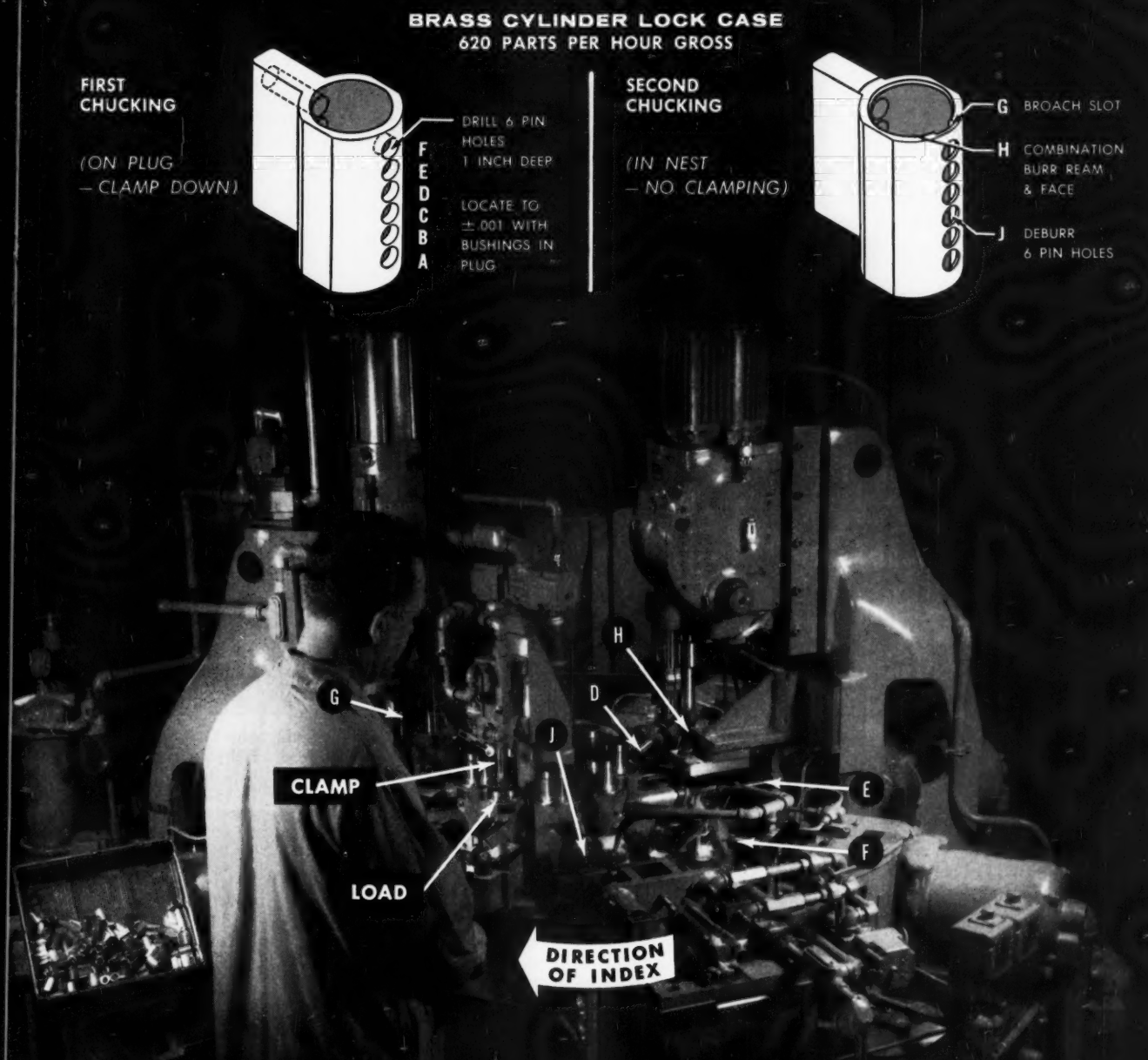
Wesley R. Liebtag was made director of planning, Supplies Div., **International Business Machines Corp.**, New York.

C. Robert Stone was named chief production engineer, **Potter & Brumfield Div.**, Princeton, Ind., American Machine & Foundry Co. He was manufacturing staff engineer.

OBITUARIES...

Stanley W. Lovejoy, 59, manager-engineering and research, Cutting Tool Div., **Pratt & Whitney Co.**, Hartford, Conn., died Sept. 24.

Forrest S. Perkins, 63, purchasing agent, **Babcock & Wilcox,** died Sept. 30.



Kingsbury machine cuts handling, makes big savings on Dexter locks

"Too much handling of lock parts causes nicking and burring. Then the assembled locks bind and we have to rework them," says Dexter Industries, Inc., of Grand Rapids, Michigan.

"Our new Kingsbury has cut our handling way down, eliminating nicks and increasing production by combining several operations in two chuckings of the work. We're delighted with it."

Each part passes twice around the machine. In the first chucking horizontal units at six stations drill the six pin holes, locating within .001. In the second chucking vertical units operate a broach and a combination tool. The last operation deburrs the pin holes; an air cylinder pushes removable pins on a block into the six pin holes.

Typical of what we can do for you. This setup resulted from the joint efforts of our sales engineers and representatives with Dexter's engineers and production men.

If you have drilling type operations in high production, may we make a proposal? Your Kingsbury will have good basic design and accurate rugged construction. It will be ready to produce when you receive it and will keep on producing. Kingsbury Machine Tool Corp., Keene, N. H.

KINGSBURY MULTI-UNIT AUTOMATICS

Fast new Signode heavy-duty tool

at least
Saves this much strapping

every time it's used

Air power tensions 1¼" strapping fast, pulls as much as 3000 pounds of pre-set tension every time. Feed wheel permits unlimited take-up of slack.

The FN-114 is the first air power feed wheel heavy-duty tensioning tool. It is fast and easy to use. In addition to saving time, it eliminates waste in the curl of strap which, until now, has been a necessary evil in applying 1¼-inch strapping with windlass type tools.

Additional savings come from the fact that the FN-114 takes strapping directly from the dispenser—takes out all the slack *before* the strapping is cut off by a quick stroke of the handle.

The FN-114—like other Signode heavy-duty tools—is available on an annual rental or single payment basis. Let us arrange a demonstration on your premises at your convenience. Just write or call. No obligation.

The powerful FN-114 holds the tension in the strapping while the operator applies the seal, using a Signode Model C tool. Signode heavy duty air-powered sealers are also available.

New 1¼" seal has open flange to permit fast, easy placement. This seal or regular thread-on seal can be lithographed with your company name, trademark, and colors.

First in steel strapping

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Union Carbide Hikes Output At Several Key Locations

UNION CARBIDE CORP. continues to make major additions to its manufacturing facilities. One of its divisions, Union Carbide Plastics Co., recently brought on stream an 80 million lb polyethylene plant at Whiting, Ind. The same division is constructing new units at its Seadrift and Texas City, Tex., plants for the production of polyethylene. Construction is scheduled to be completed next year.

The conversion of recently purchased facilities at Brownsville, Tex., to a chemical plant will begin next April. Completion is scheduled for March, 1961. Operations at Brownsville will be carried on by Union Carbide Chemicals Co. and Union Carbide Olefins Co.

Union Carbide Metals Co. plans to produce calcium carbide at its Sheffield, Ala., plant. An existing submerged-arc electric smelting furnace will be converted for production of that material. The furnace was formerly used for ferroalloy production and has been out of service for some time. The furnace will be operated by Union Carbide Metals Co. on behalf of Union Carbide Olefins Co.

Linde Co., another Union Carbide division, will construct a liquid oxygen-nitrogen producing plant near the missile engine production facilities at Ft. Crowder Reservation, Neosho, Mo. This plant will have a capacity of 135 tons a day. It will be operating in about a year.

Earlier this year the company announced plans for the construction of three other major Space Age facilities. It will build a liquid hydrogen plant at Torrance, Calif., which is slated to supply more than 3 million lb of high energy fuel a year to the National Aeronautics & Space Administration. A liquid oxygen-liquid nitrogen plant with a capacity of 300 tons a day will be completed this month at Pittsburg, Calif. A 135 ton a day liquid oxygen-liquid nitrogen plant is being built at Huntsville, Ala., near the Army's Ballistic Missile Test Center at Redstone Arsenal.

Boost R&D Facilities

Several companies are in the process of enlarging their facilities for research and development work.

Warner & Swasey Co., Cleveland, will complete construction of its 40,000 sq ft research center on Aurora Road, Solon, Ohio, late this year.

Armco Steel Corp., Middletown, Ohio, plans to double the size of its research center. Cost of the 69,000 sq ft addition and new research equipment: More than $3.5 million.

National Steel Corp., Pittsburgh, will start construction late this year on a 50,000 sq ft research and development center at Weirton, W. Va. Activities will be carried on under the supervision of J. H. Strassburger and Dr. Ivor E. Campbell, vice president and director, respectively, of research and development.

Melpar Inc., Falls Church, Va., a subsidiary of Westinghouse Air Brake Co., is broadening its research program. P. E. Ritt is manager of a recently established physical sciences laboratory. Three operational sections have been formed: Electronics, chemistry, and physics.

Forms Canadian Company

Michigan Abrasive Co., Detroit, has organized Michigan Abrasive Co. of Canada Ltd. at Kingsville, Ont. Canadian sales and service activities are being supervised by V. R. Sanford.

Completes Cuban Steel Mill

Engineering & Construction Div., Koppers Co. Inc., Pittsburgh, has completed construction of steelmaking facilities for Compania Antillana de Acero at El Cotorro, Cuba. Koppers worked in co-operation with Republic Steel Corp., Cleveland. No figures are available on annual capacity of the plant. It consists of two 77 net ton open hearth furnaces with auxiliary equipment—including charging facilities, 77 net ton ladles, slag pots, and cranes. The first furnace was tapped on May 4; the second has not been tapped.

Plans Laboratory

S&C Electric Co., Chicago, is building a $2 million laboratory to house facilities for the development and testing of high voltage circuit interrupting devices. The laboratory will augment the facilities of the Kema Laboratories in Arnhem, Holland, which S&C has used under contract in its research and development work.

Skil Builds Addition

Skil Corp. is constructing an addition to its plant at 5033 Elston Ave., Chicago. It will provide 32,540 sq ft of space for expansion of machine shop operations and storage.

Eastern Steel Expands

Eastern Steel & Metal Co., West Haven, Conn., has added 15,000 sq ft to its warehouse. Estimated cost of building and production equipment: $250,000. The firm handles strip and sheet steel and aluminum mill products.

Joins Research Group

Dr. L. F. Yntema has joined Bjorksten Research Laboratories, Madison, Wis., as a consultant on the development of foamed metals. Dr. Stanley A. Dunn has joined the laboratory to supervise projects involving improved materials.

Enlarges Steel Plant

Industrial Forge & Steel Inc., Canton, Ohio, is expanding its open hearth steel furnace capacity 50 per cent. The company is a subsidiary of Republic Industrial Corp., Newark, N. J. It has rebuilt and increased the capacity of one furnace which is now in operation. A second furnace is being rebuilt and enlarged. When that work is completed about Nov. 1, Republic's open

(*Please turn to Page* 134)

Every heat of every alloy proved on the spot

Stress-rupture testing at the Metals Division determines vacuum-induction-melted alloy life

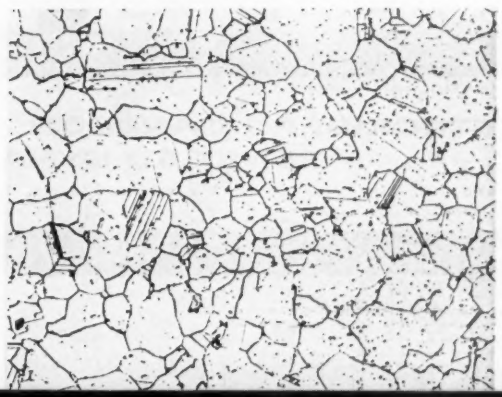
After vacuum induction melting, every heat of every alloy produced at the Metals Division, Kelsey-Hayes Company, undergoes complete testing. Included in this evaluation is the all-important stress-rupture life test.

In a massive laboratory at Metals Division, over 100 mechanical property testing machines find the rupture point of alloys under given conditions of stress, time and temperature. For example, UDIMET 700, one of the latest alloy developments at Metals Division, has a stress-rupture life of 60 hours at 1800° F and 18,000 psi. UDIMET 500 and 41, Waspaloy, M-252 and many alloys are produced and similarly evaluated at the Metals Division.

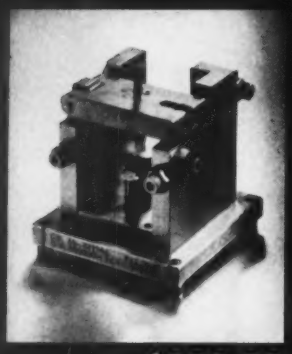
Your superalloy requirements can benefit from Metals Division vacuum induction melting facilities and technical experience. Write Dept. 11, Metals Division, Kelsey-Hayes Company, New Hartford, N. Y., for full details.

METALS DIVISION
KELSEY-HAYES COMPANY
NEW HARTFORD, NEW YORK

Over 100 stress testing machines (left) test high temperature properties of every alloy heat at Metals Division. Uniform grain structure and evenly distributed carbides contribute to remarkable stress-rupture life.



Tooling with tape...



This drill jig: $280.00

This drill jig: $4.20

you can see the profit in point positioning with DIGIMATIC* model 202 Point-Positioning System

Ask us to arrange a demonstration with **your** parts.
Write for free 12-page booklet, "DIGIMATIC MODEL 202."
Also—movies shown at your shop or plant on request.

The lowest-cost complete point-positioning system for drilling, tapping, reaming, spot facing

*DIGIMATIC IS OUR TRADEMARK

STROMBERG-CARLSON
A DIVISION OF GENERAL DYNAMICS
1489 N. GOODMAN STREET • ROCHESTER 3, NEW YORK

(*Concluded from Page* 131)

hearth capacity will have been increased to about 75,000 tons annually.

Widens Exotic Metal Work

A metallurgical laboratory to facilitate evaluation of exotic metals employed in the space and missile field has been completed at the Siegler Corp.'s Hufford Div., El Segundo, Calif. Equipment includes research heat treating furnaces.

Interstate Steel Builds

Interstate Steel Co., Evanston, Ill., is building a $1.1 million warehouse and office at 401 Touhy Ave., Des Plaines, Ill. The 83,000 sq ft facility will have a capacity of 25,000 tons of steel.

Ohio Knife Buys New Line

Ohio Knife Co., Cincinnati, has purchased the manufacturing rights to the John M. Rogers patented, inserted blade type reamers and mills from the Oak Engineering Co., Gloucester, N. J. Ohio Knife makes tungsten carbide and high speed steel blades.

Johnson to Build Addition

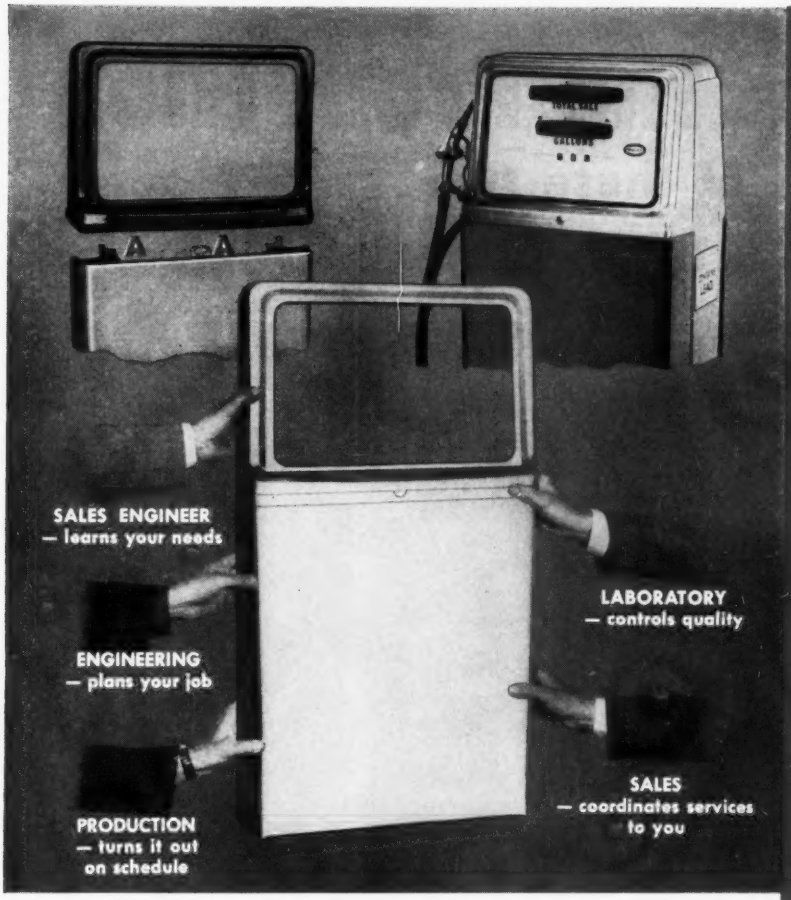
E. J. Johnson Co., Waseca, Minn., is awarding contracts for the erection of a 90,000 sq ft addition to its 22,000 sq ft assembly plant. Cost: About $1 million. The firm is engaged in electronics manufacturing.

GE Seeks More Automation

General Electric Co., Schenectady, N. Y., has established a unit to examine the company's varied operations and recommend where and how automation can be used to greater advantage. The Internal Automation Operation is headed by J. E. Ryan.

Forms Waldron-Hartig Div.

Midland-Ross Corp., Cleveland, has combined its subsidiary, John Waldron Corp. of New Brunswick, N. J., with its Hartig Extruder Div. of Mountainside, N. J. The new organization is called the Waldron-Hartig Div. Waldron makes flexible couplings and process machinery for



STAMPED Pump Housing Door, shown at left, is produced by T & W from 18-gauge cold rolled steel, or 0.050-gauge aluminum. It is 25⅝" wide, 45½" high, 5¼" deep, assembled. T & W welds on the stamped corner brackets and latch fittings, shown in the background of the illustration (A).

FORGED Diesel Connecting Rod, 16 inches long, produced by T & W Technique to hold to the exacting weight tolerances of 6 ounces, and to give a metallurgical structure of desirable machinability, and still maintain required strength and toughness for the application.

• • •

Write for 20-page book "Transue & Williams Challenges the Future" explaining how T & W Technique produces forgings and stampings that cost you less at your point of assembly.

MANY HANDS MAKE *BETTER* WORK

Every inquiry, every order you send to T & W receives special attention from *each* of a battery of experts. The ideas, the supervision, the driving force of *each* one contribute, for the best results. Teamwork is an important part of T & W Technique — a way of producing forgings and stampings for you so they usually cost you less at your point of assembly.

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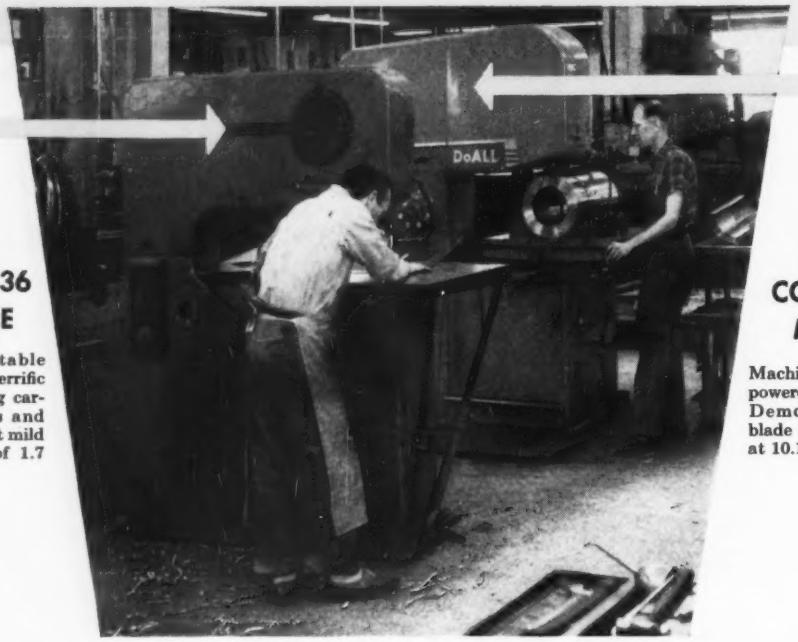
FORGINGS & DEEP DRAWN STAMPINGS

TRANSUE & WILLIAMS
ALLIANCE, OHIO, U.S.A.

Name _____ Title _____
Company _____
Street _____
City _____ State _____

Compare the Production
of these two
DoALL BAND MACHINES



1952 MODEL V36 MACHINE

Obsolete fixed table machines were terrific in their day, using carbon steel blades and manual feed to cut mild steel at a rate of 1.7 sq. in./min.

1959 CONTOUR-MATIC*

Machine hydraulically-powered work table and Demon* H.S.S. saw blade to cut mild steel at 10.1 sq. in./min.

They Look Alike...But *LOOK* at the *DIFFERENCE!*

You'll be amazed at the increased cutting rates, accuracy and finish achieved by new Contour-matic band machines. Here's a typical case:

CONTRACT JOB—splitting high-chrome, high carbon tool steel bushings 13½" O.D. x 8½" I.D. by 31" long. It took 8 hours to split a bushing on the fixed table Model V 36 using carbon steel blade.

FLOOR TO FLOOR TIME CUT 75%—Now the job is put on the power feeding table of a Contour-matic which uses Demon H.S.S. saw blades to split a bushing in just 2 hours. This splitting becomes semiautomatic with accuracy and finish greatly improved. And the tool life is 30 times longer than carbon steel blades.

Yes, there are literally hundreds of other applications where the new Contour-matic can make similar savings over fixed table saws and more expensive machines you are using for shaping cuts, recessing, beveling or cutting contours in the toughest steels. Investigate now to replace obsolete machines that can't keep up with the competitive race for lower costs. Call your local DoALL store for a free demonstration—right in your own plant—or write.

FREE—"Job Spotting" Service

For your evaluation—illustrated case histories of job savings made by Contour-matics over former methods will be mailed to you periodically. Send us your name on company letterhead.

B-57

*Reg. T. M. The DoALL Company

The DoALL Company, Des Plaines, Illinois

THIS IS A TYPICAL DoALL STORE

Call Your DoALL Service-Store

Machines and Blades · Surface Grinders · Power Saws

MACHINE TOOLS ..... CUTTING TOOLS ..... MEASURING INSTRUMENTS ..... SHOP SUPPLIES IN STOCK

paper, plastic, film, foil, and metal webs. Hartig makes plastic extrusion machinery.

Yale & Towne Expands

Yale & Towne Mfg. Co., New York, is constructing an addition to its Batavia, N. Y., plant which will permit a substantial increase in the production of Trojan tractor shovels. Development facilities will also be enlarged to supplement research and engineering work on two and four-wheel drive tractor shovels at the Valley Forge, Pa., research center.

Townsend Forms New Unit

Cherry Rivet Div., Townsend Co., Santa Ana, Calif., established manufacturing facilities for commercial fasteners and cold formed parts on the West Coast. Commercial and aircraft fastener activities were separated by moving the commercial products department to 805 S. McClay St., Santa Ana. F. C. Fearman, plant manager for the Cherry Rivet Div., announces appointment of P. W. Stewart as superintendent of the commercial products department.

Furnace Builders Affiliate

Elektrokemisk A/S, Oslo, Norway, electric furnace designer and builder, has joined with Koppers Co. Inc., Pittsburgh, and Strategic Materials Corp., New York, in the commercialization of Strategic-Udy plants to smelt and refine iron ore and other minerals. Under terms of the agreement, Elektrokemisk will design and supply electric furnaces for plants employing one of the Strategic-Udy processes; Koppers will design and build integrated Strategic-Udy plants.

Organizes Milwaukee Firm

Lewis Steel & Aluminum Co., a newly organized firm, has taken over the Milwaukee plant and production operations of the Korhumel Steel & Aluminum Corp. of Wisconsin. Lewis will be a distributor of Kaiser Aluminum mill products and process pipe in Wisconsin. Production equipment includes facilities for slitting, shearing, sawing, and edge rolling aluminum. Officers of

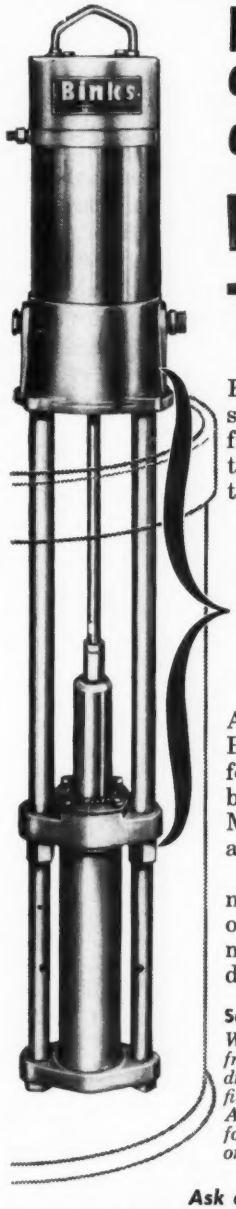
(*Please turn to Page* 140)

Now you can

SPRAY

paints
coatings
compounds

DIRECT FROM THE DRUM



Binks air-operated material handling pumps supply paints, coatings and compounds right from the shipping drum to spray gun. In-between steps are eliminated . . . so are handling time, cost and material waste.

...and Binks SPACE DESIGN pumps wear longer

Additional savings bonuses are built right into Binks pumps. They are SPACE DESIGNED for long, trouble-free service. Plenty of space has been put between the motor and pump piston. Materials just cannot sneak in to damage the air motor and cause excessive wear.

They are easy to maintain, too. Oiling is never needed. The air valve that controls the piston operation easily slips out as a unit for quick maintenance. The pump section can be easily dismantled without special tools.

Send for free bulletins

Whether you need pumps for operating from 5-gallon containers or 55-gallon drums or standpipe installations, you'll find what you need in Binks pump line. Ask your Binks industrial distributor for copies of these fact-packed bulletins or write direct.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases.

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EVERYTHING FOR SPRAY PAINTING

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Bertsch & Co. finds solution to lubrication problem–

RYKON

Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging

Problem: Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. Some Bertsch pinch rolls bend plates 4¼ inches thick by 16 feet wide for use in atomic submarines. Bearings on this big Bertsch machine share a bending pressure of 4.2 million pounds. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be

Sons of founder. Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has 7 years service with Standard, has completed the Standard Oil Sales Engineering School.

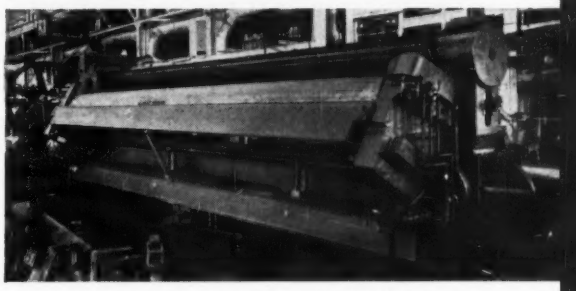
with Standard Oil's

Grease R

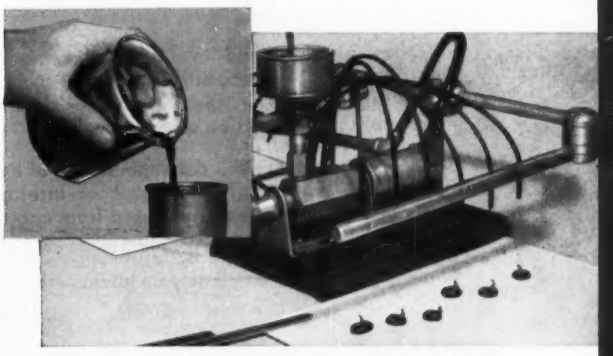
pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems. Equipment had to uphold Bertsch's eighty year reputation.

What was done: Bertsch turned to Standard Oil for help. They have been customers of Standard's for 69 years, so the move was logical. And Standard Oil man, D. M. Simmons had the answer. RYKON Grease R. This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. RYKON Grease R flows as a fluid to the pump through the equipment's central lubrication system. There it lubricates the bearings as a grease.

What you can do: Maybe you manufacture equipment that needs a centralized lubrication system and you have been looking for a grease like RYKON R. Maybe you operate equipment with centralized lubrication systems. Then you need to know about RYKON Grease R. Get the facts from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**



A Bertsch 80 ft. pinch roll, largest on record. RYKON Grease R is used in the central lubrication system of this giant unit.



Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversably converts fluid to a grease. Grease is ejected from outlet lines as in lubrication system.

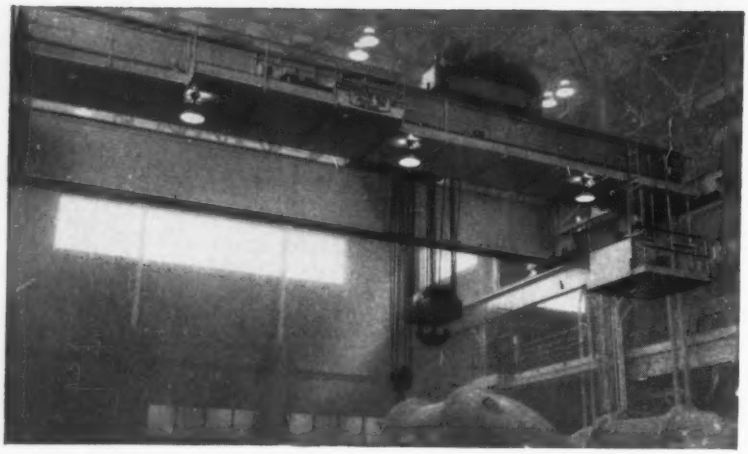
STANDARD

You expect more from Standard and you get it!

SHEPARD NILES

LARGE INDUSTRIAL CRANES

LIFTING POWER 1 to 450 TONS

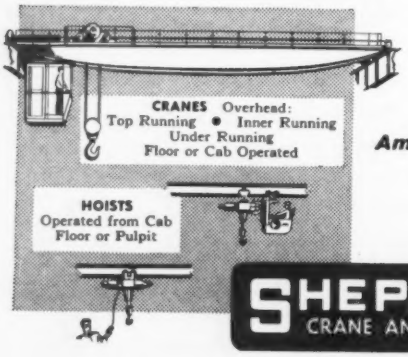


Shepard Niles places dependable lifting power at your fingertips . . . effortless power that now serves thousands of plants throughout America.

Eliminate costly ground-level handling of materials—going around men, materials and machines. Go UP and OVER, smoothly and safely through the air, directly to your destination . . . leaving **more room for production and storage.**

Shepard Niles offers you a **complete** line of heavy industrial cranes from 1 to 450 tons for constant or intermittent duty in slow, medium and high speeds; operated from cab or floor.

Send for Industrial Crane bulletin today . . . or ask that a Shepard Niles representative call at your plant—there's NO OBLIGATION.



Building America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

2390 Schuyler Ave., Montour Falls, N. Y.

(*Concluded from Page* 137)

the new firm include: President and treasurer, W. H. Lewis; vice president and manager of aluminum sales, Nick Cox.

ASSOCIATIONS

Gray Iron Founders' Society Inc., Cleveland, elected these officers: President, A. M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass.; vice president, J. E. Quest, Shakopee Foundry Co., Shakopee, Minn.; treasurer, C. R. Garland, W. O. Larson Foundry Co., Grafton, Ohio; and secretary, R. W. Wilder, Elkhart Foundry & Machine Co., Elkhart, Ind.

CONSOLIDATIONS

Pressure Blast Mfg. Co. Inc., Manchester, Conn., purchased the **Sand Blast Equipment Div.** of Leiman Bros Co. Inc., Newark, N. J. The division's property has been transferred to Manchester.

Koehring Co., Milwaukee, acquired **Larkin Packer Co.,** Waxahachie, Tex., manufacturer of oil field specialties. Larkin Packer will be operated as a division under the direction of W. H. Larkin, president, and J. J. Larkin Jr., executive vice president.

Budd Co., Philadelphia, purchased **Lewyt Mfg. Corp.,** Long Island City, N. Y., and will operate it as a subsidiary under the name of Budd Lewyt Electronics Inc. Lewyt produces data processing systems, communications for electronic counter measuring equipment, and environmental controls for electronic instruments. Budd has also completed an agreement to take over the Cleveland Welding Div. of American Machine & Foundry Co., Cleveland, maker of wheel rims for trucks and tractors.

National Metal Products Co., Carnegie, Pa., purchased **Reese Metal Weatherstrip Co.,** Minneapolis. Chester W. Ellingson Jr. has been elected president of the Minneapolis

Here, a slip joint collar is being turned and bored from a T-6 aluminum blank. Floor-to-floor time is only 25 minutes, a 30% saving in time alone.

even an engine lathe can have an impressive record of savings if it's a LODGE & SHIPLEY POWERTURN

records show $2000.00 annual saving . . . 30% on a typical operation

Significant savings are nothing new on production type lathes but it is something to write home about on an engine lathe. Tacoma Boatbuilding Co., Inc., Tacoma, Washington, liked the accuracy, versatility and output of their POWERTURN Lathe . . . found impressive savings even when this engine lathe was used for non-repetitive operations.

Whatever your turning requirements, consider Lodge & Shipley. Your needs can be filled precisely from a complete range of sizes and types . . . Production, Engine, Toolmaker, Gap, Hydraulic Tracer Controlled and Right Angle Chucking Lathes . . . all designed to provide the best machine for a specific job.

Check Sweet's Machine Tool File, your telephone book Yellow Pages or write direct for literature: **The Lodge & Shipley Company, 3070 Colerain Ave., Cincinnati 25, Ohio.**

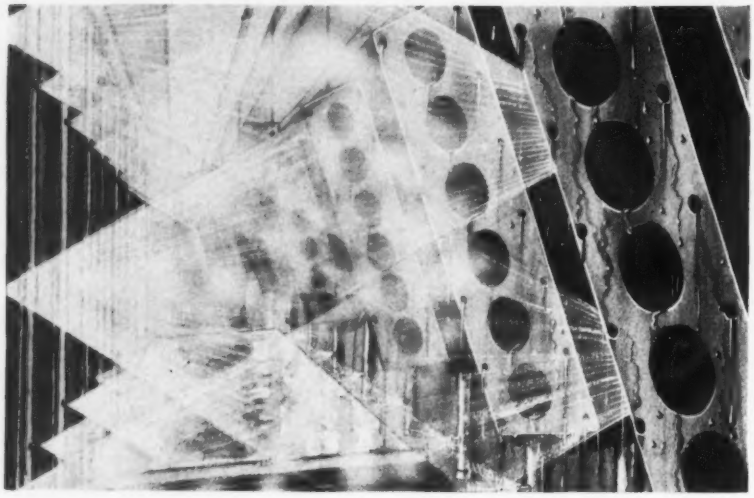
Your Lodge-ical choice . . .

Lodge & Shipley

To get more from your spray washer

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



New Oakite 198 sprays off soils fast . . . protects in-process parts from rust

Users tell us that nothing equals Oakite 198 for cleaning parts in-process. Here's why they think so:

- *It clears off heaviest soils at temperatures up to 180°F, and light soils at room temperature.*
- *Metal chips wash away under its action.*
- *When dry it leaves a protective film that prevents the rusting of machined or ground parts prior to assembly—yet it doesn't affect accurate gauging.*

Now largely used in automotive plants, Oakite 198 is proving its economy as well as its unique effectiveness in providing fast, smut-free cleaning plus rust protection. It works in single or multistage machines, at economical concentrations.

Oakite 198 is just one of a complete line of Oakite materials for machine cleaning. There are non-foaming solvent agents for heaviest duty cleaning, alkaline cleaners for removing moderate to light soils. When you ask Oakite you can be sure of getting a cleaning compound designed to give you best possible results, designed to reduce your "per unit" cost. You can be sure, too, of getting prompt, intelligent in-plant service from your local Oakite man.

Send for Bulletin. Oakite Products, Inc., 24 Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

50 1909-1959 SCIENCE

years' leadership in industrial cleaning

company which will be operated as a subsidiary. National Metal makes aluminum siding, thresholds, weather stripping, and related products.

U. S. Industries Inc., New York, acquired **Burtonwood Engineering Co. Ltd.**, Lancashire, England, producer of a broad range of products in the oil field equipment line, automotive, plastics, and material handling industries.

NEW ADDRESSES

Kaiser Aluminum & Chemical Corp., Oakland, Calif., moved the regional sales office of its **Refractories & Chemicals Div.** from Hammond, Ind., to Mexico, Mo. The office has been combined with the Central Div. sales office.

American Chrome Co., San Francisco, moved its Chicago metallurgical sales and service office to 828 N. Elm St., Hinsdale, Ill.

NEW PLANTS

Mideast Aluminum Corp. established an extrusion plant at Dayton, N. J. The key press facility: A 640 ton Sutton extrusion press. Officers are: President, R. B. Sowers; executive vice president, R. J. Gilfillan; vice president and sales manager, A. B. Schoen.

Midland Screw Corp., Chicago, opened a warehouse for its Midland Aircraft Div. at 5608 E. Lincoln, Wichita, Kans. Stocks will include military specification fasteners for the aircraft and missile industries. The facility is managed by the Zites Aviation Sales Corp.

Radio Corp. of America, New York, is constructing a 120,000 sq ft transistor and rectifier plant at Mountaintop, Pa.

Conner Fabricators Inc. opened a metal fabricating plant at 555 Going St., Pontiac, Mich. The plant has 18,000 sq ft of production and office space and is equipped to build automation mechanisms and devices, transfer tables, and automatic loaders. C. C. Layman is president.

Eyes Are Expensive Targets

THE AVERAGE EYE INJURY COSTS INDUSTRY $6.00 PER PRODUCTION WORKER PER YEAR...THAT'S MORE THAN TWICE AS MUCH AS THE AVERAGE COST OF THE SAFETY GLASSES THAT PREVENT INJURY

*In some cases over $100,000 annually

Write for your copy of new brochure "Eyes are Expensive Targets." Shows how America's leading companies are saving workers' eyes (and skills) and thousands of dollars* annually.

American Optical
COMPANY
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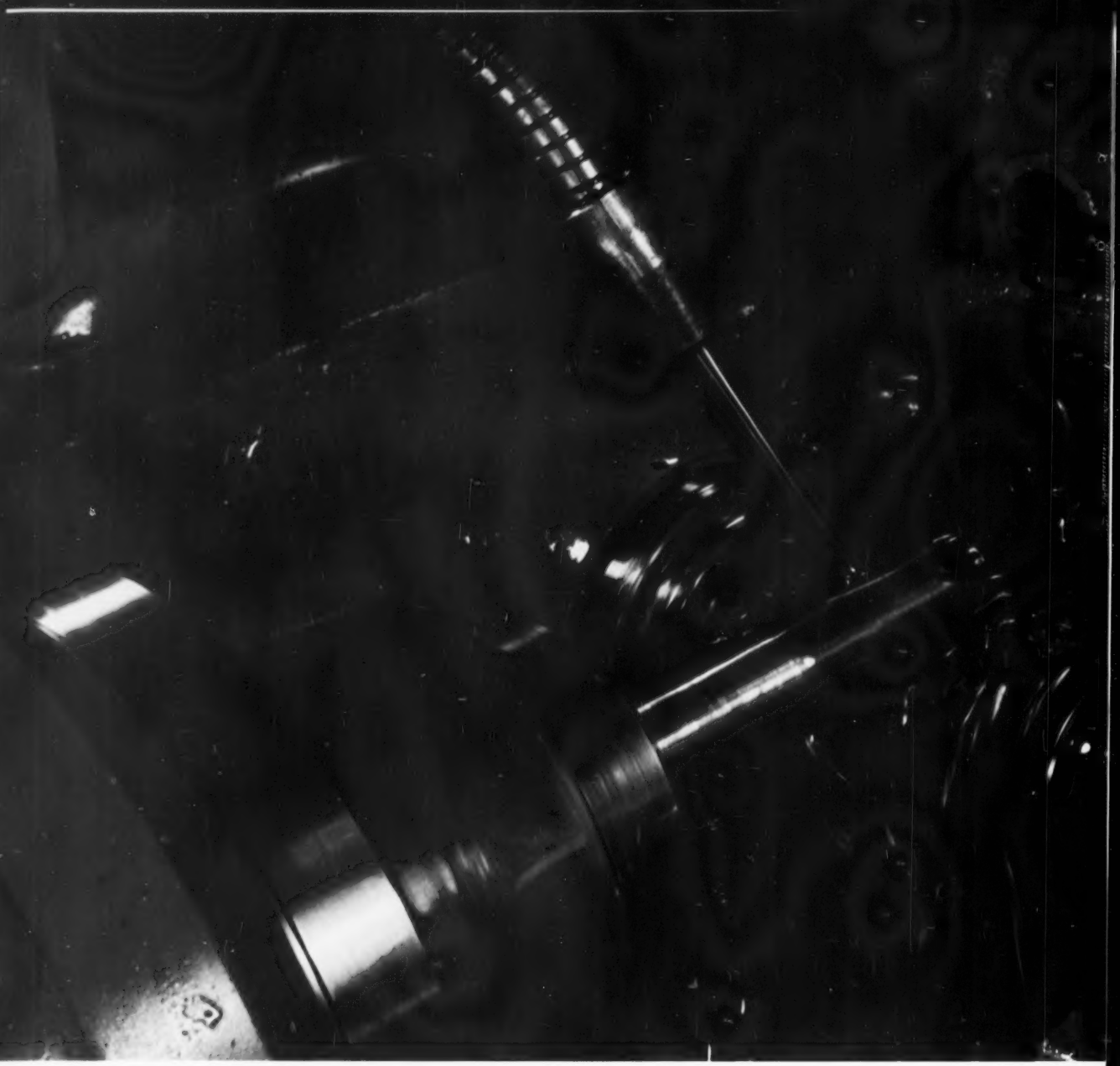
Safety Service Centers in Principal Cities

Always insist on ® Trademarked Lenses and Frames



Doubles production of splined shafts per hob shift with

GULF MAKES THINGS

"Until recently, we were using a soluble oil in the hobbing of flutes on the rifle bars for our Cleveland Le Roi drills. Then, when we installed a new gear hobber, we switched to Gulfcut 21C, a sulfurized mineral cutting oil. Since then, using the same type of hob as before, we have doubled hob life on this job and now machine twice as many rifle bars between grinds."

That's the word from Gordon Moffat, Factory Superintendent at the Cleveland Rock Drill Plant of Westinghouse Air Brake Company's Le Roi Division. This plant produces many varieties and sizes of 3 basic types of drill—the hand sinker, stoper and air leg.

"With the previous cutting oil," reports Mr. Moffat, "we were getting only 7 finished spline shafts from each hob shift, between grinds. Feed and speed were .0135 ipr and 154 rpm respectively. With Gulfcut 21C, our feed is now .018 ipr with a speed of 200 rpm. We now turn out 12-14 pieces between grinds, double our previous production. With hobs at $100 each, this amounts to quite a saving in tool costs.

"We're also getting better finishes with the help of Gulfcut 21C, and we find it much easier to stay within our specified tolerances."

Why does Cleveland Rock Drill get such good results with Gulfcut 21C? Because it provides greater sulfur activity over a wide range of machining operations.

The "rock room" where Cleveland Le Roi drills are given rugged tests before shipment. At left, Gordon Moffat, Factory Superintendent at Cleveland Rock Drill Plant. Right, T. F. Irving, Gulf Sales Representative.

Gulfcut oil . . .

RUN BETTER!

Gulfcut 21C is one of the high performance cutting oils in the Gulfcut line. See how Gulfcut can help improve your machining practices. Call your Gulf office, or use coupon for more information.

New 100-page manual gives full information on selection and usage of cutting oils. Mail coupon for your free copy of "Metal Machining with Cutting Fluids."

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

☐ Send new 100-page cutting oil manual.
☐ Send Gulfcut bulletins.

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Cut YOUR Production Costs With Parish Weldments!

Parish has the overhead handling facilities, movable partitions and available floor space to handle *any* of your weldment jobs—and cut your production costs! For years Parish welders have skillfully handled jobs from one-of-a-kind to volume production in a wide variety of metals and alloys, ranging in thickness from forty-eight thousandths up to several inches.

At Parish every conceivable welding method is being combined with rigid engineering quality control to fabricate stronger, lighter, more accurate weldments—at lower cost to you.

Parish weldments completely eliminate the inherent danger of "blow holes" which often boost production costs of iron castings.

An illustrated booklet describes the diversified facilities available to you at Parish. Write now for your free copy.

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Technical Outlook

October 19, 1959

NEW LOOK FOR BLAST FURNACES—The familiar stockhouse for assembling and charging feed materials will be replaced by continuous automatic equipment, predicts John F. Meissner, president, Meissner Engineers Inc., Chicago. His firm hopes to supply such systems.

ATOMIC ELECTRICITY GETS CHEAPER—Natural uranium, heavy water reactors can generate electricity for 19.1 mills a kilowatt hour, it was revealed at the fall meeting of the American Institute of Electrical Engineers. Compared with a low cost area like Cleveland, that's about double generating costs with fossil fuels, but it represents some progress toward cheap atomic power.

NEW USE FOR POWDERED METAL—One of the Big Three automakers has an experimental headlamp assembly made of plated powdered metal. The cost is said to be nearly 50 per cent less than the present style.

IMPROVES CASTING CORES—Corn cereal binder for green strength and corn sugar for dry strength have eliminated the need for other sand additives, says Riverside Foundry Co. Inc., Wrightsville, Pa. The firm casts gray iron and aluminum parts for small consumer products.

GAINS FOR IMPACT EXTRUSION— Partmakers are being wooed away from cold heading, thinks Verson Allsteel Press Co., Chicago. It reports tooling trials for impacts at Champion Spark Plug Co., Toledo, Ohio. AC Spark Plug Div., General Motors Corp., Flint, Mich., has been buying impact extruded sparkplug blanks from a Detroit area supplier for some time.

ADDITIVE CUTS ALUMINA BUILDUP— Diecasters who process scrap aluminum can obtain relief from bothersome crust buildup which reduces conductivity and efficiency of induction loops, states Foote Mineral Co., Philadelphia. The secret: Add 2 lb of a 5 per cent aluminum-lithium alloy per ton of charge. Several firms have reported success with the additive.

DOW ROLLS ZINC— Zinc slabs weighing 8000 lb are being rolled at Dow Chemical Co.'s Madison, Ill., plant. Previous maximum was 1500 lb, say zinc industry sources.

TOUGH METAL COAT— Films made from soybean and linseed oils work well on ferrous and nonferrous sheets, claims the Agricultural Research Service, Peoria, Ill. Coatings are said to be flexible and resist heat, abrasion, alkalis, and acids.

COMBINATION COMPUTER— A new computer that combines the features of analog and digital types is expected to spur the advance of process control, claims Computer Systems Inc., New York. Theoretical calculations are expressed immediately as digital values which can be applied directly to process controls.

COLUMBIUM SHEETS IN OFFING— Crucible Steel Co. of America, Pittsburgh, expects to roll a new columbium alloy into 36 by 96 in. sheets for use in advanced air and spacecraft. The metal promises lighter structures with far better high temperature performance than present materials. (Columbium melts at 4475° F.)

ADVANCE IN OPTICS— A volume method of casting optical quality silicon lenses, domes, and flats has been perfected by metallurgists at Hughes Aircraft Co., Culver City, Calif. (One application: Infrared sensors for the military.) Until recently it was necessary to grow crystals for each optical element. They required extensive machining. The new method holds castings to close tolerances, meaning that metal waste and finishing time are kept to a minimum.

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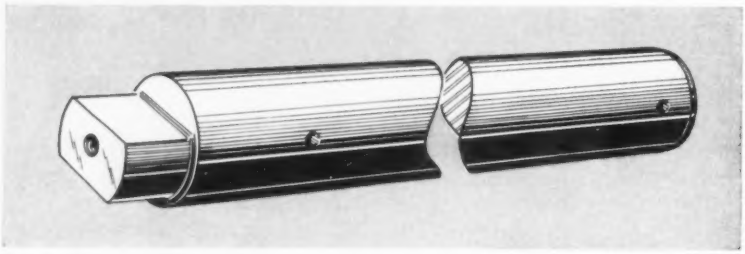
Switch to Resulfurized Steel Lowers Automotive Part Costs

COST CRISIS . . . How to Beat It

The material is less expensive and easier to machine than the alloy steels the company had been using. This is an entry in the Cost Crisis Awards Competition

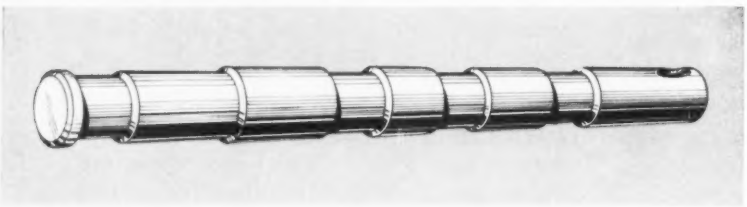
$1.09 Saved on Pivotshaft



This heavy shaft for a hydraulic crane was made of SAE 4145 steel, hardened to 285 to 363 Brinell. The material is relatively expensive and difficult to machine. Oil quenching caused frequent cracking in the corner where the two milled flats meet the large diameter.

SAE 1132 steel was substituted for the 4145 and the 3 in. OD is now induction hardened 3/16 to 1/4 in. deep to 44 to 58 Rockwell C. That gives adequate strength; the tapped threads are not affected by the heat treatment; and the angle where the flats meet the large diameter is no longer hardened. Steel costs fell 54 cents; machining costs declined 69 cents; heat treat costs climbed $1.11; and losses from cracking dropped 97 cents. Net saving: $1.09 per part.

71 Cents Saved on Valve Plug



This part, a hydraulic valve plug for a road grader, was made of 1117 steel. It was protected from carburizing on the necks but hardened to nearly 60 Rockwell C on the large diameters. Straightening was always necessary. There was occasional trouble from "creep back." Oil or marquenching alloys also warped excessively unless heated and quenched with great care.

The steel was changed to 1132 with 1/32 to 5/64 in. depth of induction hardening on the large diameters to 50 to 58 Rockwell C. Material and machining costs increased 1 cent, heat treating and straightening costs dropped 72 cents. Net saving: 71 cents per part.

MANY FACTORS affect the ultimate cost of a machine part—including material, machining, heat treating, losses in processing, and corrective procedures such as straightening.

• **"It is entirely practical to increase the cost on some factors if costs can be reduced a greater amount on others," reports Elmer H. Snyder, chief metallurgist at the Austin-Western Works of Baldwin-Lima-Hamilton Corp., Aurora, Ill.**

His company made substantial cost reductions on four automotive parts by substituting a resulfurized steel, 1132, for the steels it had been using. In one case, the new steel is more expensive; in another, the heat treating cost went up. But savings in other areas made the material change worthwhile.

Alloys added for improving machinability—sulfur, lead, selenium—provide benefits that usually outweigh the moderate additional cost and light loss in mechanical properties.

Induction hardening frequently makes it possible to substitute lower cost and more easily machined steels for alloy steels. At Austin-Western, two of the parts which were heat treated and quenched are now induction hardened.

When carbon is maintained below about 0.35 per cent, drastic quenching of carbon and alloy steels will frequently give properties comparable to higher carbon and alloy steels whose costs are greater and machinability lower.

Drastic quenching in water, brine, or caustic solution will cause warpage of parts with big section changes and high slenderness ratios. But a large percentage of parts do not have such inhibiting features, or the warpage is not detrimental for the intended use, explains Mr. Snyder.

• **"We have found 1132 steel superior for parts which are to be**

drastically quenched or induction hardened to levels under 60 Rockwell C," relates Mr. Snyder.

The pivotshaft (see illustration) is a husky piece. With less manganese, it would fail to give the required 44 to 58 Rockwell C hardness for the specified 3/16 to ¼ in. depth. With higher carbon, cracking would occur frequently, especially where the two crossholes meet the surface with no blunting countersink or rounding.

Without the additional sulfur, drilling of the holes and tapping the end thread would go slower. Tool costs would be higher.

The valve plug must be straight within ten-thousandths of an inch and the edges of the large diameters must be sharp. With 1132 steel, the edges may be so badly overheated in induction heating that they melt; still they do not crack. With 1141 steel, the part must be cautiously heated and quenched when induction hardened or the edges will crack and pop off as perfect rings.

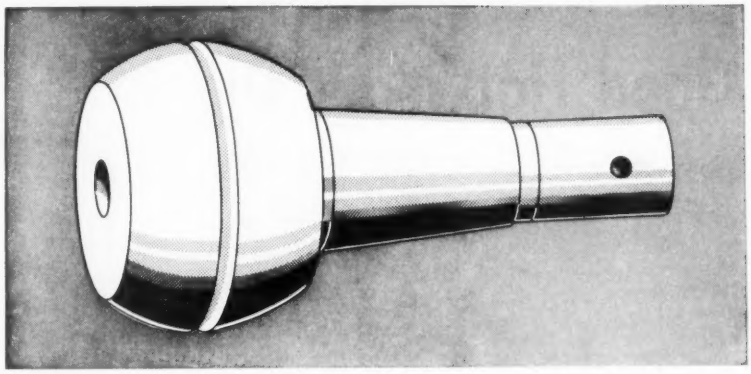
With the pivotshaft, the depth of induction hardening compared with total diameter is small enough to prevent any significant warpage. With the valve plug, heating is done by scanning with the part rotating and only the larger diameters are ordinarily hardened. Warpage is low.

The ball stud, if made in sufficient quantities, would be forged or upset. In smaller quantities it is turned from bar stock. A substantial amount of metal is removed. Not only did the 4140 steel machine slower, but it also dulled tools much faster.

When given a drastic quench, a steel of higher carbon content would frequently crack where the crossholes go through only 3/16 in. from the end. The piece is short and chunky enough to keep warpage low, and because it is a part of a ball and socket joint, a few thousandths of an inch warpage is unimportant.

The driving hub has a large diameter for its section thickness but is relatively symmetrical. It is rough bored and broached before heat treatment and rebroached and drilled afterward. Even when heat treated to 269-311 Brinell by drastic quenching, it machines better than the 4140 steel formerly used.

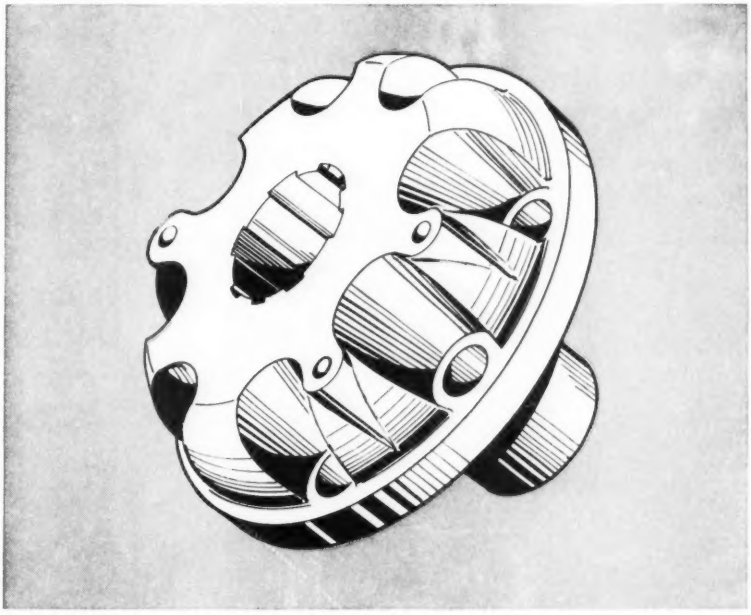
26 Cents Saved on Ball Stud



This stud for a road grader (it's part of a ball and socket joint in the steering linkage) used to be made from 4140 steel hardened to 341 to 401 Brinell. The steel was expensive and difficult to machine. The part is now made from 1132 steel, which costs less, is easier to machine, and gives a better finish. When drastically quenched and tempered, the 1132 steel meets the Brinell hardness specification.

Steel costs are down 11 cents; machining costs are 15 cents less; heat treating costs are unchanged. Net saving: 26 cents per part.

$1.91 Saved on Driving Hub



This component for a road grader wheel was made of 4140 steel hardened to 269 to 311 Brinell. It was forged solid, and rough machining was done before hardening. Both the rough machining and that done after hardening were relatively slow, and tools dulled rapidly. Tapped holes were particularly difficult.

With 4140 steel, parts had to be oil quenched. Now that 1132 is used, they can be quenched in water, brine, or caustic solution. Cost per forging has come down $1; machining costs dropped 91 cents; heat treating costs are unchanged. Net saving: $1.91 per part.

How to Identify a Good Hot-Work Die

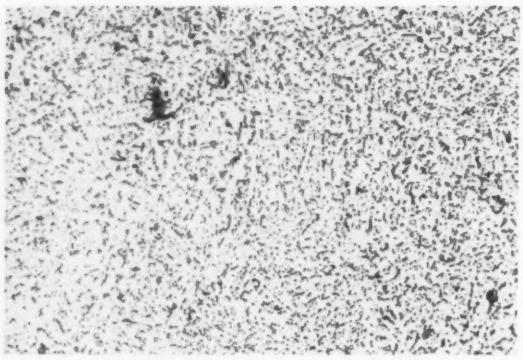
HOT FORMING requires a steel with a combination of resistance to deformation, toughness, and heat resistance; the alloys use chromium plus tungsten and molybdenum and often add other major constituents. Proper heat treatment of these alloys is essential if they are to stand up in such service as forging, diecasting, extrusion, plastics molding, and hot piercing.

R. F. Harvey, research metallurgist at Braeburn Alloy Steel Corp., Braeburn, Pa., has prepared a series of photomicrographs of AISI Type H-12 hot work die steel, showing typical good and bad microstructures for comparison. Similar alloys (H-11 to H-15 designations) would have comparable microstructures. All samples were etched in nital, and the magnifications are shown for each set. Carbide distribution is a function of the amount of working and hence the section size; desirable structure will approach that shown.

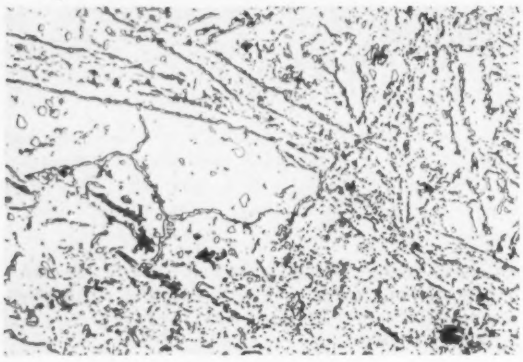
Annealed

(X500)

DESIRED



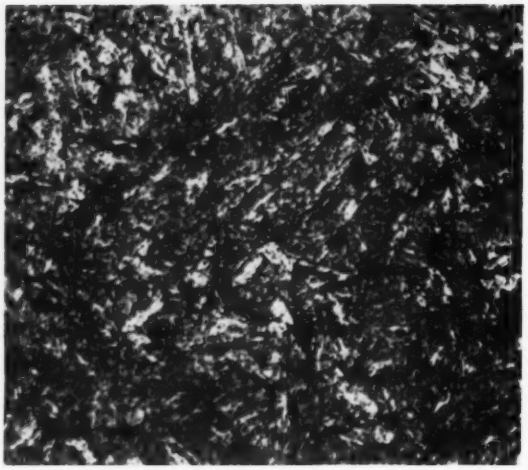
UNDESIRABLE



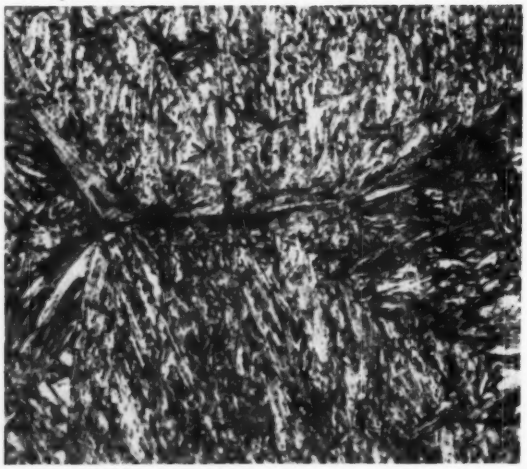
Heat Treated Structures

(X1000)

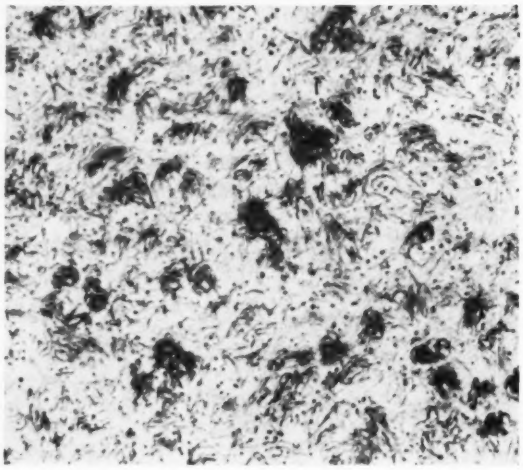
DESIRED



OVERHEATED



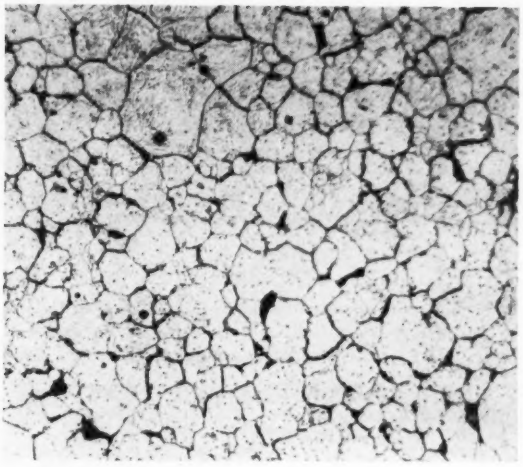
UNDERTEMPERED



Grain Size

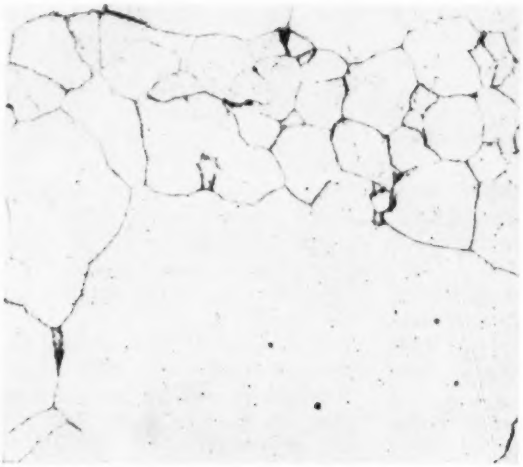
(X500) NOT TEMPERED

DESIRED



COARSE

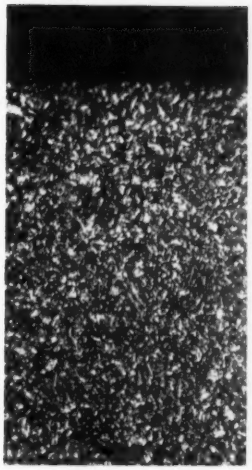
DUPLEX



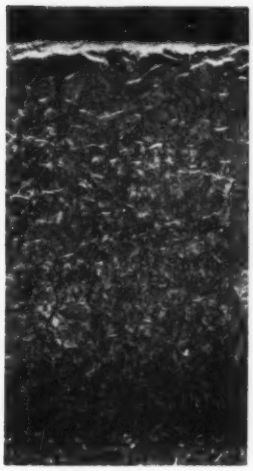
Surface Condition

(X200)

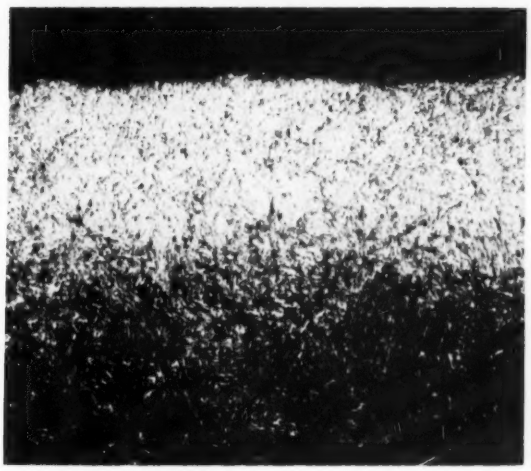
DESIRED



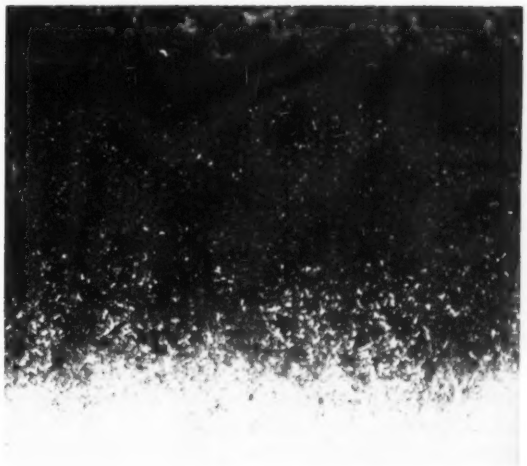
NITRIDED



DECARBURIZED



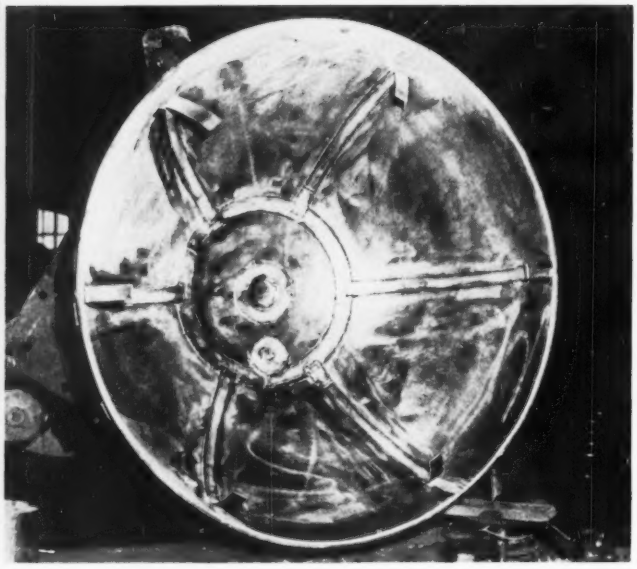
CARBURIZED



Fabricator Scores Breakthrough In Joining Titanium Clad Steel

Titanium-clad steel reaction vessel was built for a petrochemical firm by Chicago Bridge & Iron Co.

Inside of bottom tank head shows titanium strap welds which eliminate joining titanium and steel directly. It was one of the problems that had to be solved before the composite material could be joined



WELDING techniques developed by Chicago Bridge & Iron Co., Chicago, for joining titanium clad steel may be the springboard to greater use of titanium and titanium-clad vessels throughout the chemical, petrochemical, paper, and other processing industries.

By cladding 0.078 in. thick A-40 titanium sheets (produced by Crucible Steel Co. of America) to ½ in. thick mild steel with its vacuum bonding Hortonclad process, CB&I has fabricated a pressure vessel which provides titanium's corrosion resistance at considerably less cost than that of solid titanium structures.

• Two problems were surmounted in building the vessel:

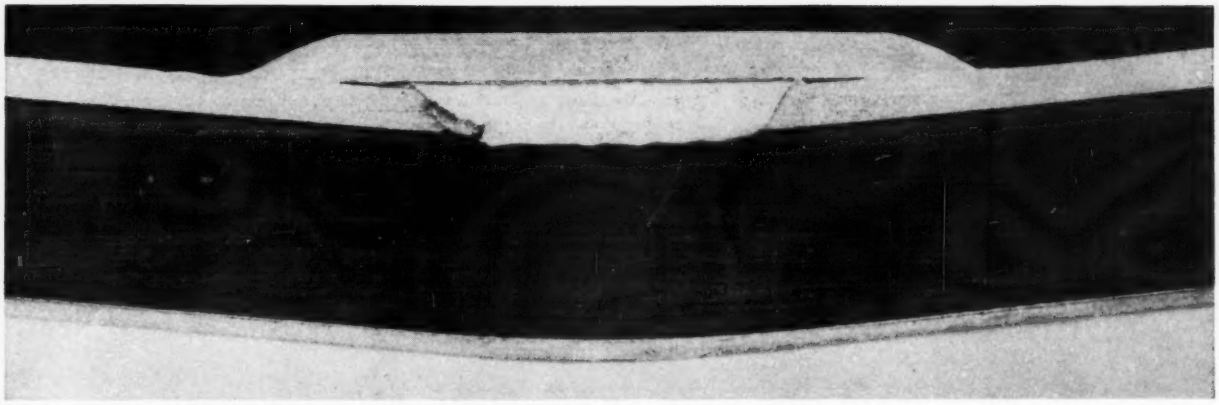
1. Strong, ductile bonds were made between the large mating surfaces of the titanium cladding sheet and the steel backing plate.

2. A weld joint was developed in which the titanium and steel were not directly joined by welds. (Steel to titanium fusion welds are extremely brittle.)

In bonding the titanium to the steel, CB&I starts with the base plate cut to size. Braze metal is applied, and the cladding metal is positioned. With special equipment, the assembly is heated while pressure is exerted on the exterior surfaces. A high vacuum is maintained between the two metals.

Aside from joining the two materials, the brazing metal prevents contamination of the titanium by the steel.

The segmental head pieces of the pressure vessel were formed warm. If the titanium clad plates had been cold formed, they would have exhibited considerable springback.



The less drastically formed sections were worked cold without difficulty.

• A special welding technique was used for closing the titanium-steel composite plate seams.

It involved a silver inlay at the steel joint capped with a titanium cover strap. (See the photograph and drawing of a weld seam cross section.) The strap method combines weld strength for design considerations, freedom from notches or brittleness, and a complete containment of the vessel contents by uncontaminated titanium-to-titanium fillet welds.

All inlay welds were checked for soundness. The load bearing steel welds were checked by x-ray before applying the silver inlay and the titanium strap.

The drawing of the nozzle shows how the techniques of fillet welding in titanium and silver inlaying are applied at fittings.

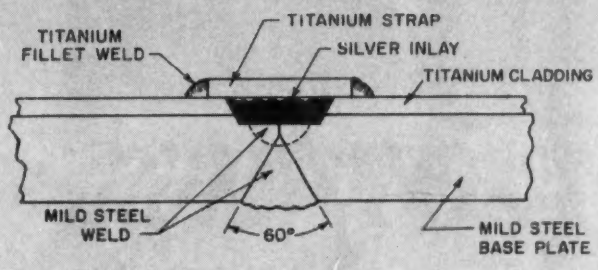
• The pressure vessel was built for Shell Development Co., Emeryville, Calif., a Shell Oil Co. subsidiary.

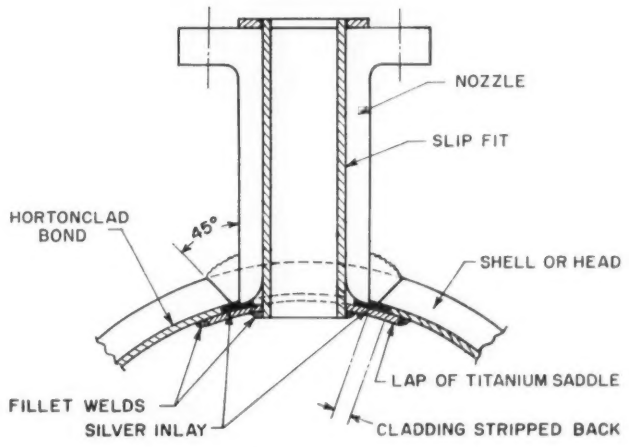
It is designed to operate at 150 psi and 500° F. The first full size reaction vessel of its type, the structure is 11 ft 7 in. high and 4 ft in inside diameter. It was assembled from 16 segments and cylindrical shapes plus fittings.

The feasibility of fabricating large titanium clad vessels from integrally bonded materials has been proved. The cost of the material limits usage to the thicker vessels (over ¼ in.), but the cost picture is changing.

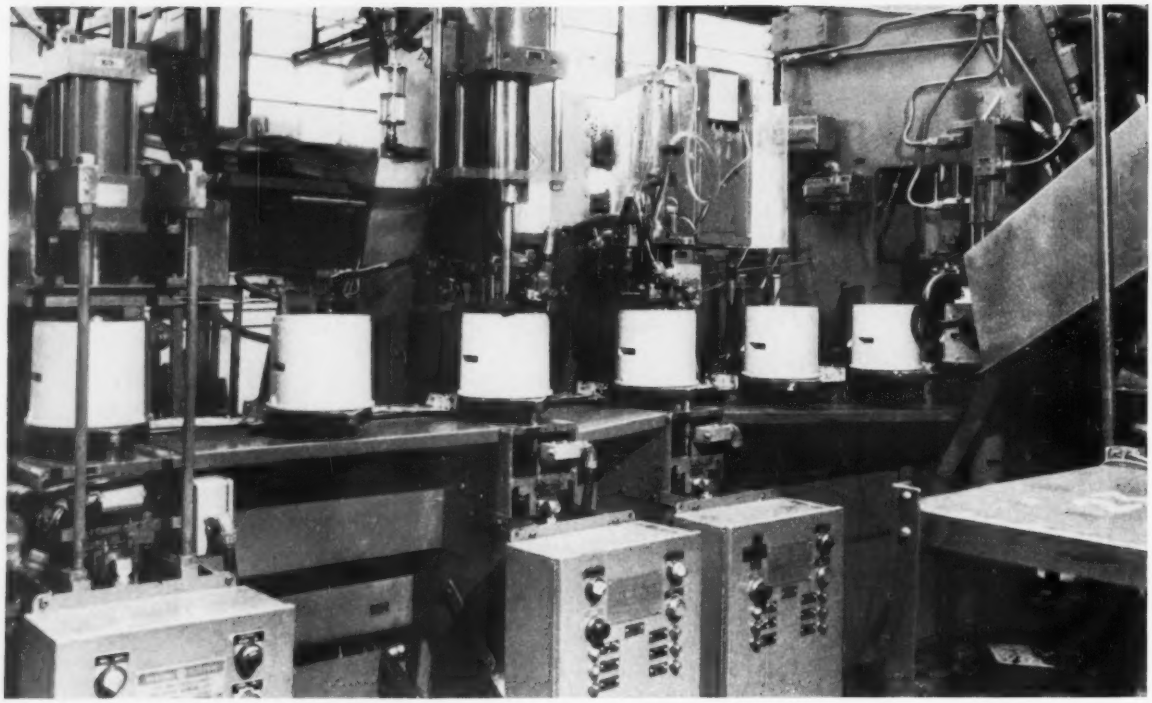
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

The photograph above and drawing below show the method for closing the composite plate seams. It involves a silver inlay at the steel joint which is capped with a fillet welded titanium cover strap





This representative detail of a nozzle shows how fillet welding in titanium and silver inlaying are applied at fittings



Bearings inside garbage disposer housings are sized and faced on this automatic line

Automatic Peening Machine Hardfaces Motor Bearings

Rollers on rotating tool do the job. Results: Parts for General Electric's Disposall wear longer and operate more smoothly than those faced by other methods

WEARING SURFACES are work hardened and faced to close tolerances in one operation at the Appliance & Television Receiver Div., General Electric Co., Appliance Park, Louisville.

Bearings used in General Electric's Disposall garbage grinder are conditioned on an automatic machine supplied by Cogsdill Tool Products Inc., Detroit.

• Peening, instead of scraping, gives a smooth, hard finish. Operation is incorporated in an automatic assembly line.

Cam-actuated rollers, around the periphery of a rotating tool, peen and work harden the bearing surface, meeting a tolerance of 0.0006 in. and producing a surface finish of 7 microinches. Dimensional changes can be made by installing larger or smaller rollers in the tool (in 0.0001 in. increments).

Operating costs are modest—the tool can be rebuilt for about 20 per cent of its purchase price.

Bearings are surfaced at one of six stations in an automatic assembly setup. They're loaded into housings, pressed into place, and finished. Then mounting holes are drilled, and motors are assembled.

• The process helps hold rejects to a minimum, even with high quality control standards.

Rigid inspection procedures include tests for sound, vibration, wattage input, and magnetic field characteristics. All could be affected by faulty bearings.

Powder metallurgy and improved facing methods keep rejects from being a cost accounting item, says H. L. Wolf, manufacturing engineer. That's important on items retailing at $59 to $79; rebuilding of a unit rejected because of bad bearings would take a major portion of the original cost.

• Peened bearings last longer and give smoother operation than those finished by other methods.

Greater axial strength can be built into bearings by the new method, say General Electric engineers. Parts aren't weakened in the sizing operation; pressures and strains produced in other sizing methods are eliminated.

The peening process produces a better microinch finish than other sizing methods. Elimination of microscopic grooves and ridges makes for more uniform distribution of lubricants through porous metal and over the bearing surface.

US RUBBER MATCHLESS STEAM HOSE

How to stay alive working next to live steam

Steam—indispensable workhorse in an industrial plant. But if it breaks loose, steam may cause death on contact. Yet this man works with complete security—literally within an inch of his life—because he's working next to the hose that steam cannot burst: wire-braided U.S. Matchless® Steam.

This hose gives ample notice when replacement is needed. Even after long, hard service (and with 200 pound steam pressure) the safety-sure wire-braid construction of U.S. Matchless prevents it from bursting. Instead, just a wisp of steam is allowed to seep through. This acts as a safety device, telling you that replacement is needed. That's why plant safety councils all over the country find no match for U. S. Matchless.

Despite its great ruggedness, this hose is flexible, lightweight, easy to handle.

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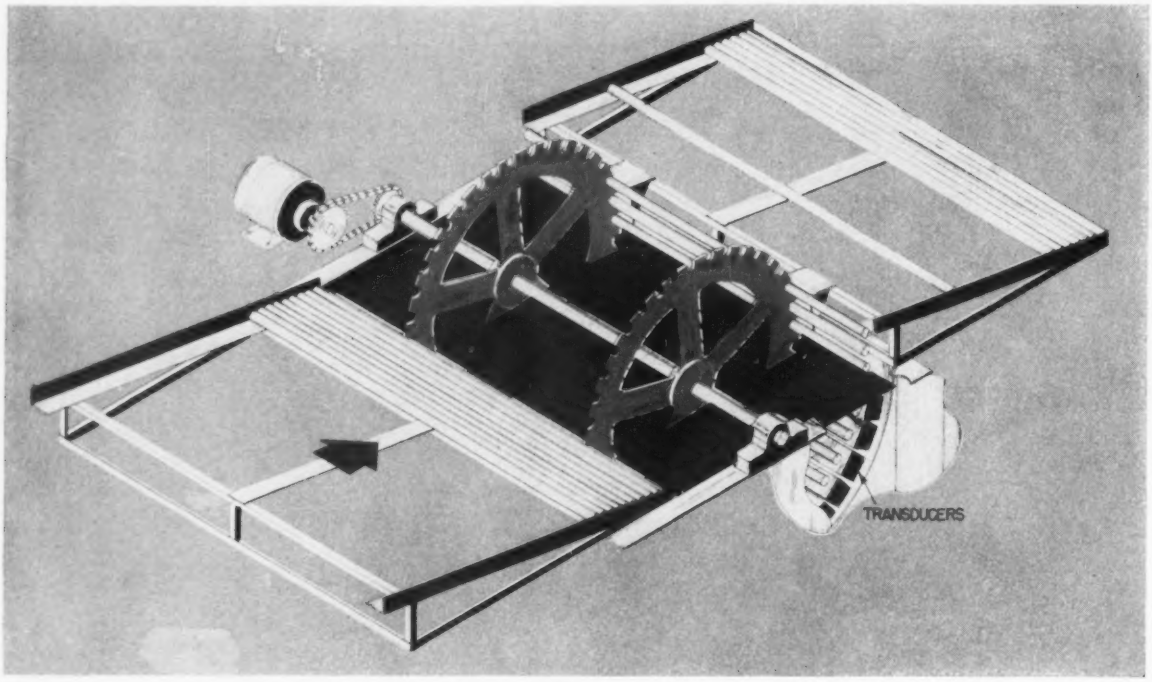


Cog conveyor carries round bars through an ultrasonically activated pickling solution

Ultrasonic Setup Speeds Bar Pickling

Rapid removal of scale and smut permits hot rolled rounds to be processed continuously; machinery can be tied in with automatic material handling systems

BOTTLENECKS common in batch pickling of steel bars can be eliminated with a continuous processing line developed by Branson Ultrasonic Corp., Stamford, Conn. A cog type conveyor moves the hot rolled rounds through a bath agitated by ultrasonic transducers.

The company will display a working model of its pickling unit at the 1959 Metal Show in Chicago.

• Ultrasonic agitation of the solution removes scale quickly and uniformly; it permits continuous processing.

A single bar can be pickled in an ultrasonically activated solution in 1 to 3 minutes vs. 20 to 30 in a static bath. Pickling smut is removed as it's formed, and bars are ready for drawing or other cold finishing.

Faster pickling rates permit the processing of bars on a continuous, mechanized line. Output from such a system is high in relation to the floor space it requires. And fumes can be removed easily with a hood and exhaust system.

Conveyor speeds can be adjusted to match pickling rates needed on different grades of steel. The unit can be used with automatic material handling equipment to increase plant output.

• A conventional pickling tank is fitted with bar guides, cog drive wheels, and ultrasonic transducers.

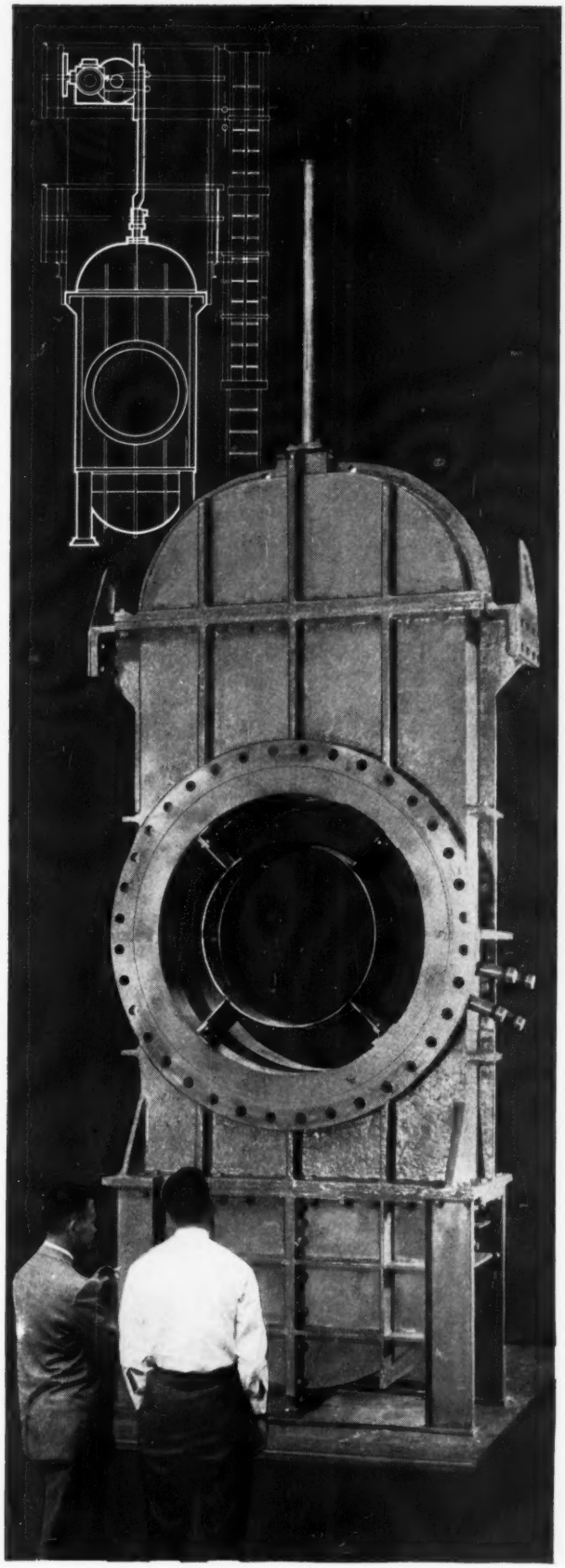
The cog type conveyor carries bars through the pickling bath along a fixed pass line. Transducers, positioned above and below the pass line, agitate the solution around the bars, removing scale and smut. Time in the tank is controlled by the angular velocity of the cog wheels.

An installation proposed by the company is only 40 ft long, using cog wheels 3 ft in diameter. For bar stock having an ultrasonic pickling time of 1 minute, surface speed of the conveyor is 3 ft per minute; delivery rate is 120 tons per hour (540 bars). For a 3 minute cycle, surface speed is 1 ft per minute; delivery rate is 40 tons per hour (180 bars).

The system can handle bars in random lengths, if several cog wheels are spaced across the tank.

• Conventional systems are slower: Bars must be pickled in bundles.

Bundles of hot rolled shapes are immersed in vats containing 8 to 10 per cent sulfuric acid, at 140 to



NEW

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Valve disc and body are water cooled to prevent overheating while the stove is on blast. Motor-operated drive unit is located on a platform above the valve, well clear of stove heat. This valve is bolted tight to the burner and stove saddle flange, thus preventing leaks at the burner. *Write for Bulletin GB-100.*

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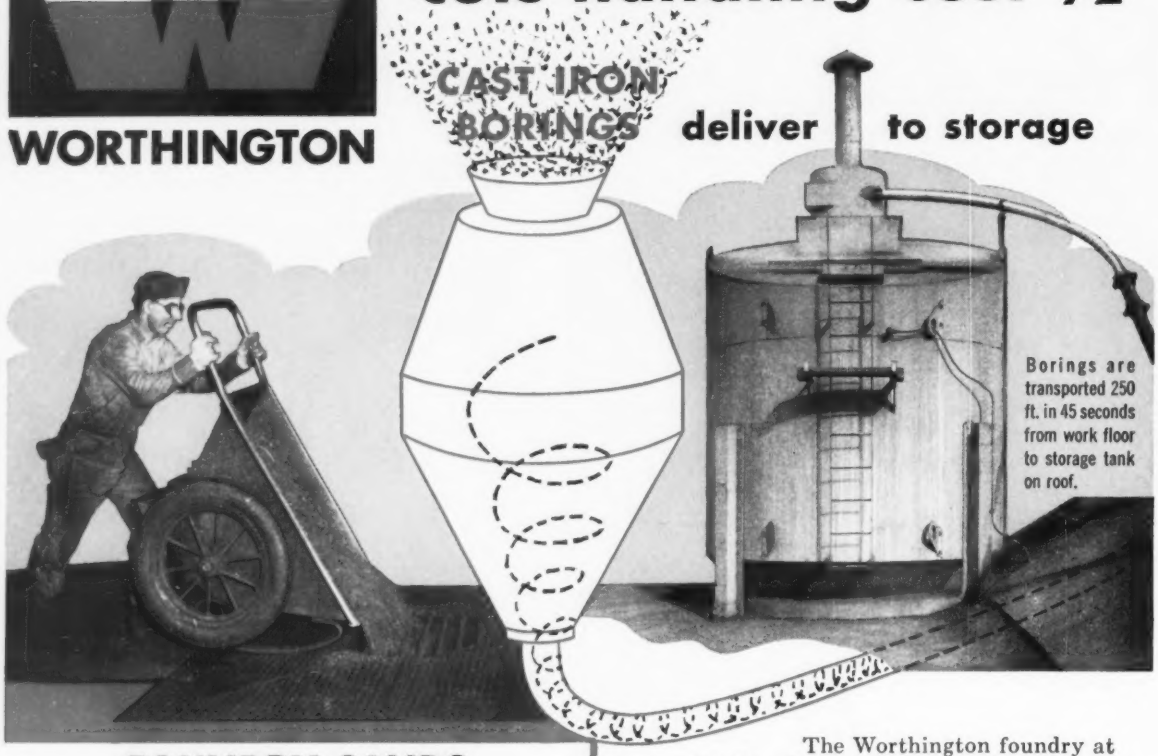
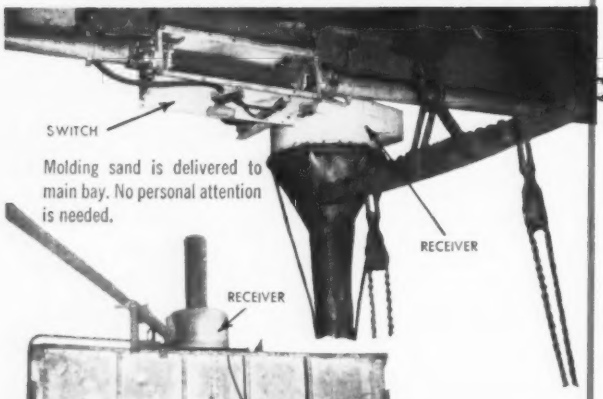
WORTHINGTON cuts handling cost ½

CAST IRON BORINGS deliver to storage



FOUNDRY SANDS DELIVER TO 4 STATIONS

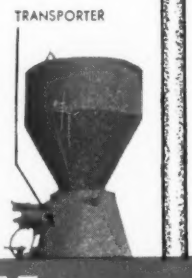


Illustrated switch allows sand to be supplied to large molding hopper in the far end of plant. Note: conveyor tube can be routed under crane runway. No need for catwalk or extra supporting structure.

The Worthington foundry at Oil City, Pennsylvania transports borings to a storage tank located on the roof with minimum labor and maintenance costs. Borings are gathered and dumped through floor grating to transporter. No other handling is involved. Foundry sands are delivered to anyone of 4 stations as needed by the use of Whirl Air Flow transfer switches that direct sand flow through overhead tubes. Production delays caused by sand shortage has been entirely eliminated at the Worthington foundry since Whirl Air Flow was installed.

Maintenance work on the system is negligible and most important, direct material handling costs are reduced by ½ at this Worthington foundry. Cost of installing Whirl Air Flow is much lower than you would imagine. Just let us estimate a Whirl Air Flow system to fit your foundry need.

***WRITE TODAY**—an engineer will show you how a Whirl Air Flow system will save you money.*



WHIRL AIR FLOW PNEUMATIC CONVEYORS

WHIRL-AIR-FLOW

452 25th Avenue S.E., Minneapolis 14, Minnesota • FEderal 9-0231

175° F. Up to ten lifts of the bars are kept in the solution 20 to 50 minutes, depending on the grade of steel, acid concentration, temperature, and bath condition.

Product quality suffers when bars are in tight bundles. Acid circulation is poor; outer bars are overpickled; and inner bars aren't well cleaned. Pickling smut, held against the bars, interferes with action of the acid.

An overhead crane must be used to handle large bundles (batch systems can't be conveyorized). And production rates can't be increased without adding more tanks.

Vertical Turret Lathe Handles Big Parts Faster

Production cost savings of 20 to 30 per cent were recorded in the first six months after replacement of an old model lathe by a vertical turret lathe (Bullard 46 in. Cutmaster) at Philadelphia Gear Corp., Philadelphia. Biggest saving is in running time. Simultaneous cuts can be made on outside and inside diameters and bigger workpieces can be handled.

The new unit is designed to efficiently and accurately handle such parts as a gate hoist drum (for a hydroelectric dam project). The drum is furnished as a part of a complete assembly that includes a motor, speed reducers, and a cable drum on a common bedplate.

Two helical gears form the end pieces of the drum. The lathe machines and faces them prior to cutting the teeth. Outside and inside diameter cuts are made at the same time with a single setup. Brinell hardness of the carbon steel gears is 200. The complete drum is 30 in. high, weighs 4000 lb.

The lathe is more rigid and solid than the earlier model and is better able to take heavy cuts—as much as ½ in. at 250 ft per minute on the diameter, cites Philadelphia Gear. Concentricity can be maintained to 0.0002 in.

The pendant control (capable of a semicircle swing) enables the operator to select all table speeds, feed and traverse speeds, and directions from a single station. Bullard Co., Bridgeport, Conn., made the lathe.

Low carbon stainless steel tubing in this heat exchanger resists oxidation, humidity, and salt spray corrosion. Carbon precipitation and embrittlement problems are minimized

316L Tubing Passes Test for Aircraft Heat Exchangers

LOW CARBON stainless steel tubing (Type 316L) minimized carbon precipitation and eliminated embrittlement problems in the making of aircraft heat exchangers at AiResearch Mfg. Div., Garrett Corp., Los Angeles.

The division makes heat exchangers which operate in a hot air stream (from 400 to 1000° F). The units must withstand oxidation, humidity, and salt spray corrosion. No leaks must be evident under 500 psi internal pressure. Paper thin tubing (0.005 in. thick) is used to keep weight down. An 18 x 12 x 7 in. heat exchanger for a Douglas DC-8 weighs only 20 lb.

Type 316 of the commonly produced austenitic grades was recognized as having high corrosion resistance and creep strength, but under certain conditions, it is subject to carbide precipitation and embrittlement. That clinched the job for 316L.

• **Tubing Tests**—To make sure that tubing meets specifications, special testing is done before shipment by Superior Tube Co., Norristown, Pa. In the leak test, tubing is immersed in water and subjected to 100 psi (nitrogen). Bubbles (called champagne leaks) cause immediate rejection of the tubing section where the leak occurs.

Ductility is also important for easier bending and for vibration absorption. The tubing is annealed and then flare tested to 0.203 in. A microscopic examination at the finish draw must show a #5 grain size or finer.

THIS IS CORONA EFFECT

SPECTACULAR—
BUT IT'S ONE OF HIGH-VOLTAGE CABLE'S WORST ENEMIES

Corona means crown. It can also mean trouble for ordinary high-voltage cable—because corona is also the name for a low-energy electrical discharge (the glow around the crown at left) which actually cracks and splits ordinary rubber insulation. How? By ionizing any air in between and around conductor and insulation, it creates ozone, ultraviolet light, and certain nitrogen compounds.

And ozone, for example, works itself into ordinary rubber insulation and splits the long-chain rubber molecules. In time you see the costly result—cracked insulation and cable failure.

HERE'S ANACONDA'S ANSWER

Butyl—the most effective rubber insulating material ever developed—has inherent resistance to ozone. And—to aging, moisture, and heat.

But—butyl handles differently from other rubbers. Additives, usually in the form of finely divided powders, are extremely difficult to disperse uniformly in the raw butyl. Butyl also presents special vulcanizing problems. In short, proper manufacture of butyl insulation requires specialists and specialized equipment at every manufacturing step.

That's why Anaconda built a new plant for just one product—Anaconda Butyl (AB) Cable. The men behind this specialized equipment have but one job too—to study and improve the design and manufacture of butyl-insulated high-voltage cable.

This specialized manufacture and specialized inspection, test and quality control are part of the reason why Anaconda Butyl (AB) Cable means long-range economy and reliability, and why you should specify (AB) to protect your investment in high-voltage cable.

Send for publication DM 5903: High-Voltage Durasheath* Cable to Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

*Reg. U.S. Pat. Off. 59257

ASK THE MAN FROM

ANACONDA®

ABOUT BUTYL (AB) HIGH-VOLTAGE CABLE

Builder Puts Accent On Numerical Control

Cincinnati Milling Machine Co. features a number of tape and card controlled machines at show commemorating its 75th anniversary. Their range of application is emphasized

IN Cincinnati Milling Machine Co.'s 75th anniversary show, "Adventures in Progress" (STEEL, Oct. 12, p. 62), company management made it known that they are in the numerical control field in a big way.

Seven tape or card controlled machines were demonstrated for users. Other machines were shown at work on regular production machine jobs in the plant manufacturing areas.

• **Broad Spread**—Some years ago the company built sophisticated contouring controls for big, five axis aircraft skin mills. Now it is completing the range with low cost, two axis positioning controls.

Machines under data guidance at the show included: A two axis point-to-point system on a 21 in. lathe; three dimensional contouring on two vertical Hydropel milling machines; a traveling column Hydropel with three dimensional guidance; and two position tools—one under a 24 in. sliding head drill.

• **Sales Talk**—Company salesmen are pushing three features of their contouring controls: Parabolic interpolation, cutting tool compensation, and automatic repositioning.

Parabolic interpolation, they say, can drastically reduce the amount of data you have to put into a program. On curves, instead of plotting a series of extremely close points, you can pick a few of the points, and the control interpolates the shape of the curve between them.

Cutting tool compensation lets you use a dial to correct for cutter grinds that make the tool smaller. Also, you can rough cut, reset the dial, and finish cut with the same tape and the same tool. Further, you can compensate for a new cutter that may vary from nominal size by as much as an inch.

Automatic repositioning can be invaluable if you have to interrupt the machine cycle—for example, to change or inspect the tool. By measuring a base point, each dimension set in a tape is measured as a fixed percentage of total reference voltage. In use, this means you can cut into the controlled cycle at any time, move the tape or spindle to any position, turn off the machine and forget it. On restarting the cycle, all machine elements will return to the break-off point, and the cycle will take up where it left off.

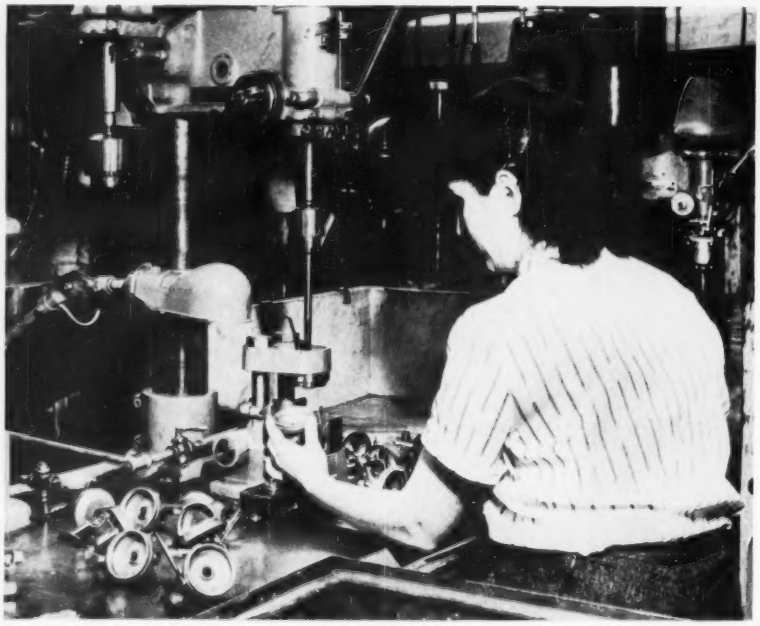
With those contouring controls, and the same basic control system for positioning, Cincinnati engineers are set to prove that numerical control has a potential for nearly every shop.

Watch Hot Machining

You may be able to get a tenfold increase in machinability on some of the difficult metals by simply heating the workpiece. Evidence of tests from Cincinnati Milling's research laboratory indicate that the approach has a real potential for supermetals.

Example: A piece of AISI 4340 alloy steel, about 550 Brinell, was induction heated to 1000° F, just ahead of a single-tooth carbide flycutter. Tool life was good at 550 sfpm and a feed of 0.006 in. per tooth.

Without the heat, the job requires high speed steel cutters. To get equal tool life, the speed would have to be held to about 40 sfpm.



SPECIALLY TOOLED DRILL PRESS quadruples output on reaming job formerly done on a horizontal boring machine. At the Lionel Corp., Irvington, N.J., this operator reams 350 Airex fishing reel frames an hour. Rigidity of a guide bushing, in line with a head that's shimmed on the column, holds tolerances to ±0.0002 in.

Drawbenches and Cold Draw Equipment

• As a cold draw specialist for better than 50 years, Aetna produces a full range of equipment and accessories . . . Drawbenches from 20 to 200 feet drawn length, with pulling capacities from 1,000 to 300,000 pounds in single, double, triple or five draw; single chain or dual chain; accessory items, such as Tube Pointers, Piercing Mills, Run-Out Tables, Pinch Rolls, Shears, Straighteners, Carriages and Drives.

New Aetna ideas for improving production include the 5-draw Drawbench and a new type of Bull Block. The 5-draw has changed the entire cold drawn business. The Bull Block makes possible much more economical production of long-length, small-diameter, thin-wall copper tubing. Aetna's Block is noted for its absolute accuracy in transversing the die to the drum during drawing and control of speeds from zero to 2000 feet per minute.

But Aetna's main effort centers on the design and building of complete plants or complete automatic lines. Aetna's reputation is built on design pioneering and equipment built to produce a quality product with the ruggedness to take heavy loads as needed.

Aetna's customers include every major producer of cold drawn material for tubes, bars and shapes. This is Aetna equipment in the recently completed plant of The American Brass Co. at Los Angeles.

BLAW-KNOX

BLAW-KNOX COMPANY

Aetna-Standard Division

Frick Bldg., Pittsburgh, Pa.

DOW | MAGNESIUM PRODUCTS

ARE YOU GETTING ALL THESE BENEFITS WITH YOUR MAGNESIUM CASTINGS?

Dow magnesium foundry offers experience, production capacity for sand and permanent mold castings of all sizes and shapes.

The unique capabilities of Dow's Bay City, Michigan, foundry help users of magnesium sand and permanent mold castings. Activities at this facility—largest and best equipped of its kind—run the gamut from large volume production jobs to one-shot "specials".

Huge or tiny castings. The foundry is capable of producing castings weighing in excess of 3,000 lbs. down to ounces—in all degrees of complexity. Experienced pattern engineers ensure that the best use of casting processes is made. This can result in either lower costs, improved quality, better deliveries, or a combination of all three.

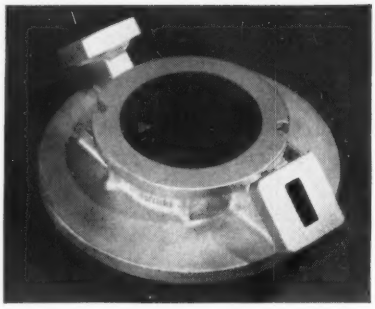
Newest techniques. Many milestones in magnesium casting have been reached at this Dow foundry. In fact, Bay City has men permanently assigned to developmental work, keeping the foundry in the forefront of technological advances at all times.

Results of their work include special processes for cast-in inserts and tubeless passages, and improved melting techniques. Casting methods have been developed for many of the newer magnesium alloys, such as the elevated temperature group and the new high damping capacity alloy, K1A.

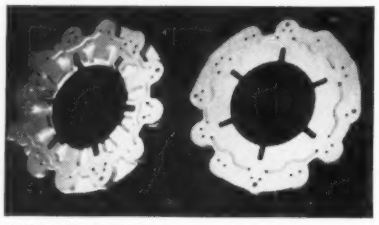
Quality control. A full time quality control team exhaustively checks all work, from alloy composition to the shipping dock. A direct-reading spectrometer makes rapid alloy composition analyses. Its speed is particularly valuable when alloying elements that are hard to hold in the molten state, such as thorium, are present. Chemical analysis is also frequently employed.

Testing facilities. Molding and sand cores are analyzed as a regular part of casting quality control. Radiography, fluorescent penetrant inspection and other testing facilities are used to check properties and specifications.

Experienced magnesium team. The foundry often draws upon the broad range of specialized experience available throughout the company. To Bay City customers, this means assurance of high quality work, done with utmost efficiency and economy. If your requirements involve magnesium castings, Dow can help you arrive at optimum casting design and reliably supply your production requirements.



THIS SAND CAST WAVE GUIDE was held to ±.005" on passageway dimensions. Surface smoothness requirements are 63 RMS. The foundry has government approval for any phases of its operations where such approvals are applicable.



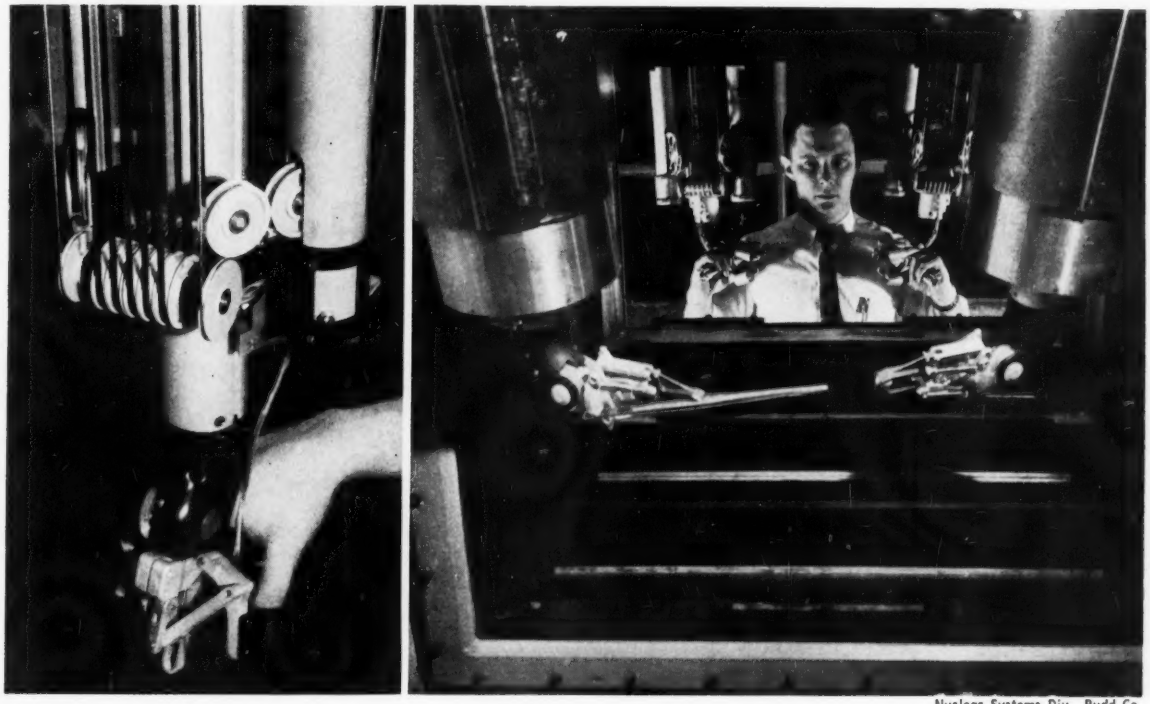
THIS BRAKE CARRIER is sectioned to show how the hydraulic lines were integrated by use of tubeless passageway casting techniques.

WRITE TODAY for this illustrated brochure discussing Dow foundry services. THE DOW METAL PRODUCTS COMPANY, Midland, Michigan, Sales Dept. 1303LE10-19.

THE DOW METAL PRODUCTS COMPANY, Midland, Michigan

DIVISION OF THE DOW CHEMICAL COMPANY

Strip Is Muscle for Metal Hands



Nuclear Systems Div., Budd Co.

Manipulator transmits motions of operator to metal fingers inside radioactive area

High cobalt alloy is used in manipulator that handles radioactive materials. It transmits motion and touch in the belt and pulley system. Friction and stretch are held to minimum

REMOTE manipulation of radioactive materials is given a lifelike "feel" by high cobalt, Nilcor alloy strip in the Master-Slave Manipulator made by Central Research Laboratories Inc., Red Wing, Minn.

The strip transmits motion and "touch" in a belt and pulley system that reduces stretch in the manipulator by 80 per cent and cuts friction by 90 per cent in comparison with previous designs.

• Seven strips transfer motion and force so that the slave end duplicates the motion of the master though it is up to 10 ft away.

Friction and stretch in the transmitting system must be held to a minimum to give the operator the touch sensation. Design objectives, based on work that originated at Argonne National Laboratories, Lemont, Ill., were to reduce energy losses due to friction, backlash and overshoot, as well as to create an identical sense of touch.

Dr. Demetrius Jelatis, a principal contributor to the design, states that technicians without special training can operate the manipulator.

Nilcor (an alloy of 40 per cent cobalt, 20 chromium, 15 nickel, 7 molybdenum, 2 manganese, 0.04 beryllium, 0.15 carbon, balance iron) is made by Athenia Steel Div., National - Standard Co., Clifton, N. J. Dr. Jelatis said it was chosen for a combination of high fatigue resistance, high tensile strength, and good corrosion resistance. Since the strip does not move out of the radioactive area, it cannot carry contaminated materials to the operator.

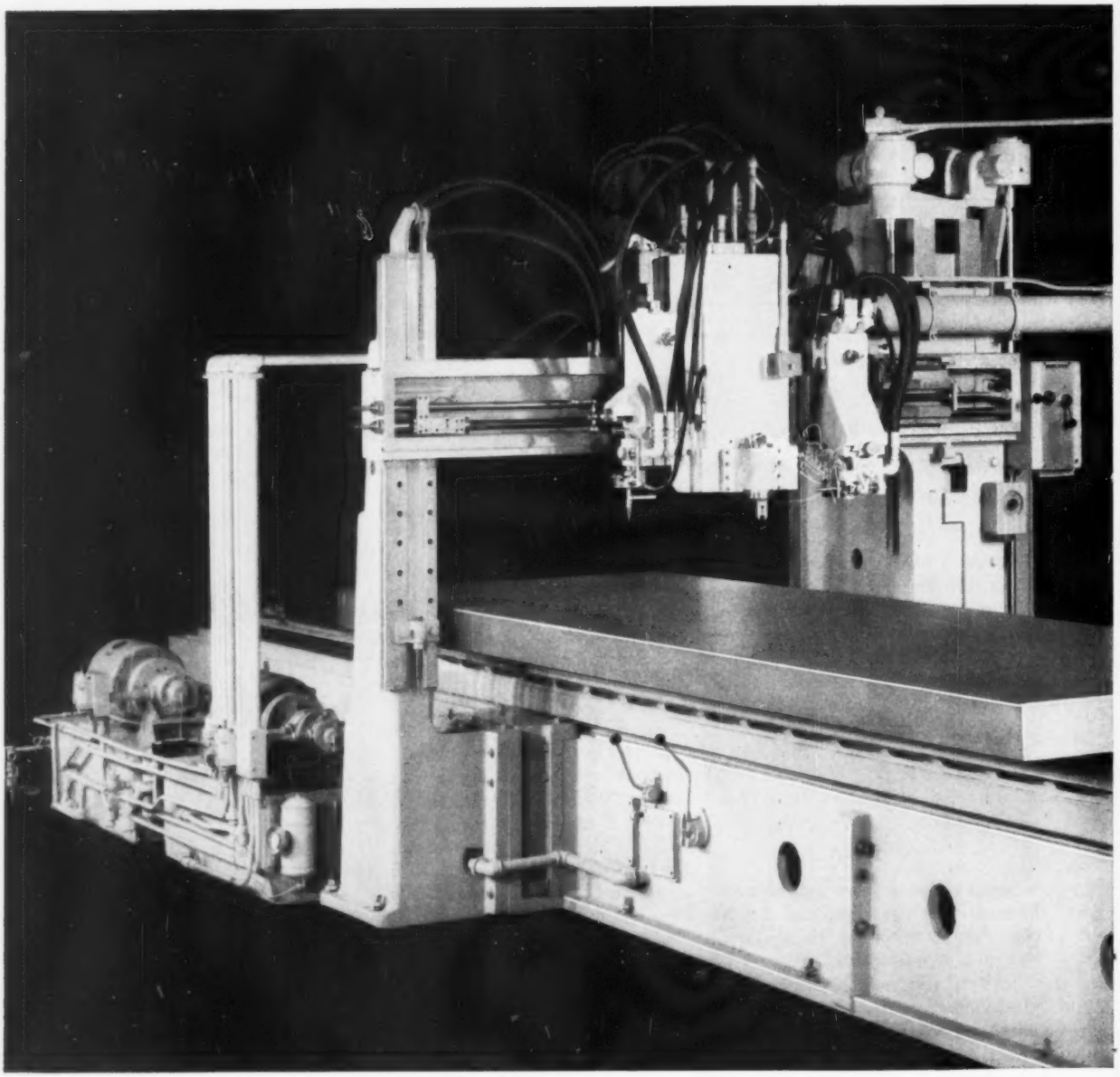
The strip has a yield strength of 280,000 psi and a Vickers hardness of 702. It is not affected by fingerprints, humidity, or a 500 hour salt spray exposure. It is also nonmagnetic and highly acid resistant.

To get desired flexibility, the strip has a nominal thickness of 0.005 in. and is 0.185 in. wide. Design provides for a stress of 20 per cent of yield under steady full load, while impact loads may go to 25 per cent.

• From five to seven pulleys are required for each of the seven control loops.

Friction is reduced because the strip makes line contact with the crowned pulleys and tends to center itself so that contact with the pulley flanges is avoided. The strip is supplied with less than ½ in. lateral sweep in an 8 ft length resting flat without tension, to further reduce the chance of contact with the pulley flanges.

Nothing does the job like a.

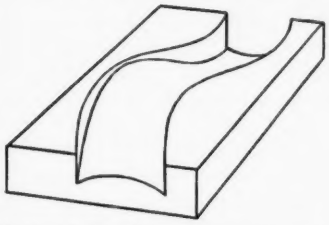


ROCKFORD

HYDRAULIC

TRACER-PLANER

MACHINES COMPLICATED CONCAVE-CONVEX AIRCRAFT PARTS IN ONE-TENTH FORMER PRODUCTION TIME



Actual savings on spar-like aircraft parts*:

- One set-up completes machining, no hand finish
- Risk of tool breakage involves only simple planer tools.
- Produces parts from rolled billets instead of expensive forgings.
- Produces parts from inexpensive masters.
- Eliminates forging dies, machining matrixes and warped parts.

*Complete production facts on request.

Nothing performs like hydraulic power...

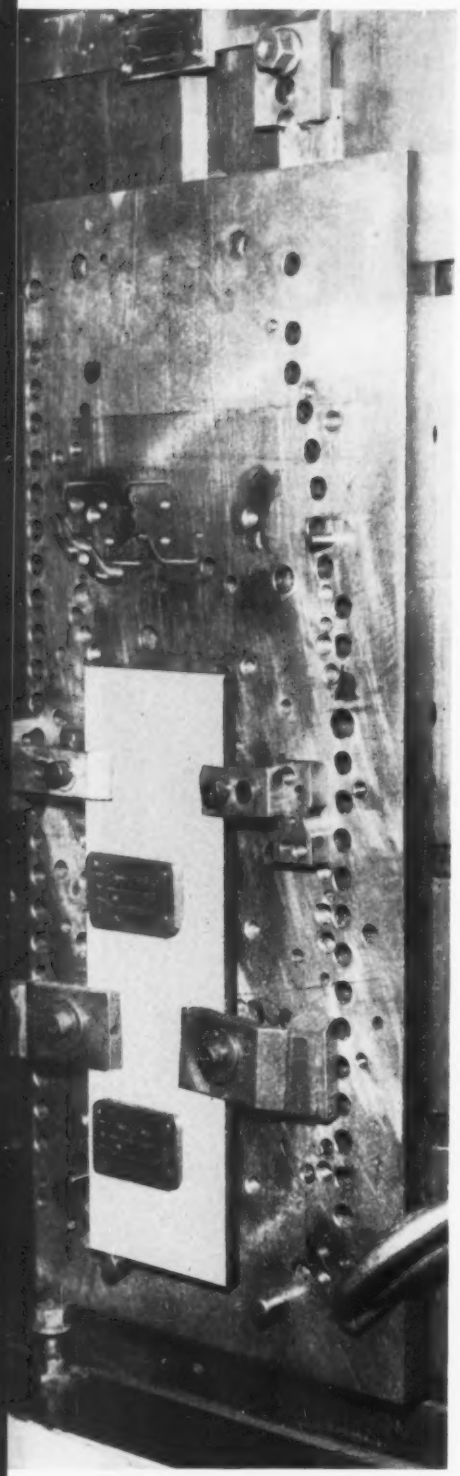
- Infinitely adjustable feeds and speeds;
- Smooth, uniform cutting pressures for finer finish;
- Maximum metal removal per H.P. expended;
- Low Costs for machining, cutting tools and maintenance.

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

Pioneers In The Use of Hydraulic Power for Reciprocating Machine Tools

This Die Was Made in 15 Hours . . . Standard Methods Take 250



Multiple die set for an office-type erasing shield required almost 250 manhours to make by conventional methods

You can get more than three times the number of dies for the same dollar, claims the patent holder. Other advantages cited: Regular tool steel is used; maintenance costs are low

YOU can trim the cost of diemaking an average of 70 per cent—that's the claim Albert E. Payne, president, Pay-Les Die Div., Payne Tool & Engineering Co., Springfield, Ohio, makes for his patented diemaking process.

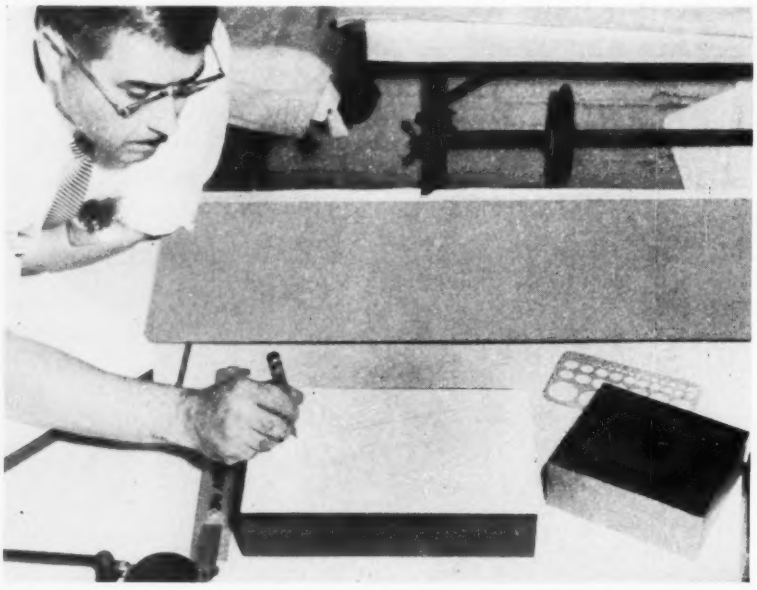
"Dies made the new way perform as well as or better than the regular type," he states. "Standard tool and die steels are used. They are selected to fit the material being blanked or formed. Both the punch and die cavity are heat treated and hardened the usual way."

Other benefits cited: Dies are accurate; maintenance costs are lower than those of standard dies (the new type has three parts instead of 14); and alignment is no longer a problem.

Several auto firms are using dies made by Mr. Payne's method.

• Much of the secret is in the elimination of the slow layout work. Also, practically all metal is removed by drilling instead of kellering.

The die designer starts by drawing directly on a prepared die blank, using the engineering drawing as a guide. (Blanks are surface ground and blued, then covered by regular masking drawing paper glued into place.) The outline is carefully pricked and scribed, and the paper drawing removed. The designer also indicates each hole he wants drilled for removing metal.



The die blank is punched and scribed through the superimposed drawing. Resulting layout looks like the punch and die at right—it's for blanking GM insignia. Practice eliminates need for additional layout work by machinist or diesinker and is more accurate than most bench layouts, says Mr. Payne

The punch usually is made first. In some cases, its sides are reverse tapered. Where thick stock is to be blanked, the punch also has a flat vertical section near the top equal to the stock thickness. It permits resharpening operations.

The die cavity is only partially drilled out. None of the drilling overlaps, and it is kept at least 1/16 in. inside the finished outline of the cavity. End mill drilling breaks down the walls between the drilled holes.

Broaching is done in a 2000 ton hydraulic press with the punch or die afterstoned and hardened. Excess metal is simply sheared and flattened into the bottom of the cavity and left there. If any breaks off during the broaching, it is easily removed, but no attempt is made to completely finish the cavity. (Experienced diesinkers and diemakers sometimes have difficulty understanding that, since they feel each surface has to be completely finished even though it may have no practical significance.) Following broaching, the punch or die is ground back to provide a 5 to 6 per cent clearance for the blank.

• Standard die sets and punches are also used.

The choice of such parts greatly speeds delivery time and simplifies the replacement jobs later on. His dies can be used in a standard dieset for maximum economy and interchangeability.

Standard strippers can be used, although Mr. Payne says that steel faced rubber is the more popular and less expensive. He uses Eastman 910 adhesive to get a good bond between the metal and rubber, although other adhesives may be satisfactory. (Tensile tests show that the rubber parts, never the joint.)

• Forming dies can be made with the same method. Attachments and proper die arrangement reduce blanking scrap.

Mr. Payne emphasizes: A special device being developed for his dies will eliminate slitting the sheet steel and enable manufacturers to use standard mill widths. Scrap can be chopped into small pieces as it leaves the die.

The procedure is said to save handling time.

Etchant for Teflon Simplifies Bonding

A FAST, simple method of bonding Teflon to itself and to other materials uses an activated form of sodium in solution (called Tetra-Etch).

It reacts with Teflon to form a carbonaceous film for anchoring adhesives. The compound is compatible with such adhesives as epoxies, phenol formaldehydes, and most rubber and silicone types, says W. L. Gore & Associates Inc., Newark, Del.

• **Use**—Special equipment is not required. Tetra-Etch is poured or swabbed on the surface to be treated. It can also be used as a dip. When the compound's original dark color has disappeared, you clean off the residue with a damp cloth or flush it off with water. The etched area will show a definite change of color where the carbonaceous film has formed.

Treatment time ranges from about 5 seconds to 1 minute (depending upon the application and conditions). Peel strength with a typical epoxy adhesive runs from about 17 psi on smooth Teflon to 35 psi on corrugated ribbon.

The compound reacts quickly with oxygen, water, or carbon dioxide in the air, forming caustic soda and destroying the solution's potency. For this reason, 2 ounce bottles (up to 3 sq ft of coverage) are normally packaged. You can get larger sizes for jobs where the material will be used rapidly, or where production facilities are set up to exclude air with a nitrogen atmosphere.

• **Continuous Dip Lines**—Rates of 50 to 60 fpm are possible on nitrogen blanketed continuous dip lines if the wire, tape, or tubing is first preheated to between 180 and 200° F. It should be postheated in a nitrogen atmosphere after the etching dip.

Oxygen Steelmaker Installs Handling System

One of the largest oxygen steelmakers in the Midwest is using pneumatically controlled weighing and conveying systems to handle additions of limestone, burnt lime, and pellets to the vessel during the progress of the heat.

Among advantages cited: Low maintenance costs.

The system was engineered and installed by Allen-Sherman-Hoff, using control systems developed by Hagan Chemicals & Controls Inc., Pittsburgh.

SOME OF THE 476 FORGED STEEL NUTS AND BOLTS used to fabricate seven, 140,000 hp hydroelectric turbines for the Rocky Reach Hydroelectric Project, Wenatchee, Wash., are shown at the York, Pa., works of Allis-Chalmers Mfg. Co.

NEW TREPANNING LATHE

will handle high-alloy forgings up to 67 feet long

Reportedly the fastest as well as the largest trepanning lathe yet built in the United States, this huge machine will bore holes from 2" to 20" in diameter.

Faceplate speeds range up to 250 RPM. Boring-bar tailstock can be either stationary or rotating—with rotating speeds up to 400 RPM.

To eliminate damage to the mechanism from chips, the double rack-and-pinion feed is located under the ways. Rack-pinion design permits unlimited length of travel. Adjustable overload feed protection provides automatic bar retraction. Special roller steadyrests are supplied for convenient loading and high-speed operation.

We are prepared to engineer a trepanning lathe to meet your requirements. Send us your inquiry today.

FARREL-BIRMINGHAM COMPANY, INC.
CONSOLIDATED MACHINE TOOL DIVISION
565 Blossom Road, Rochester 10, New York
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

CM-48

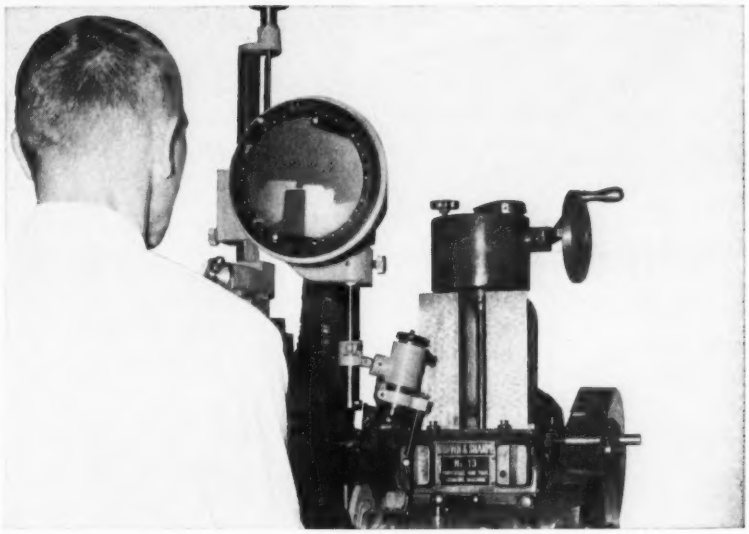
FARREL
BETTS
®

Portable Optical Projector Can Be Set Up in Minutes

CONTINUOUS precise magnified checking, direct measurement, and comparison of work contours (to transparent overlay charts) can be done with the Stocker & Yale machine tool projector.

Savings in machining time, closer control, reduced spoilage, operator training, and better equipment utilization are claimed for the unit. It may be easily converted from one application to another or it may be permanently mounted on existing grinders, lathes, milling machines, or other machine tools. Setup time is a matter of minutes when using universal or special adapters.

The projector's most conventional use is with circular and flat form tool grinding, production grinding of precision contours, regrinding of tools, and dressing of critical wheel and tooth shapes. Other uses: It can be applied to precision locating of printed circuit points, monitoring of extruded wire insulation, glass blowing contours, coil winding, metallizing, and many miniaturization problems. You can get application engineering assistance.



Accessories include standard interchangeable magnification of X10, X20, X31.25, protractor screen, illuminators, and mounting compounds for direct linear measurement to 0.001 or 0.0001 in.

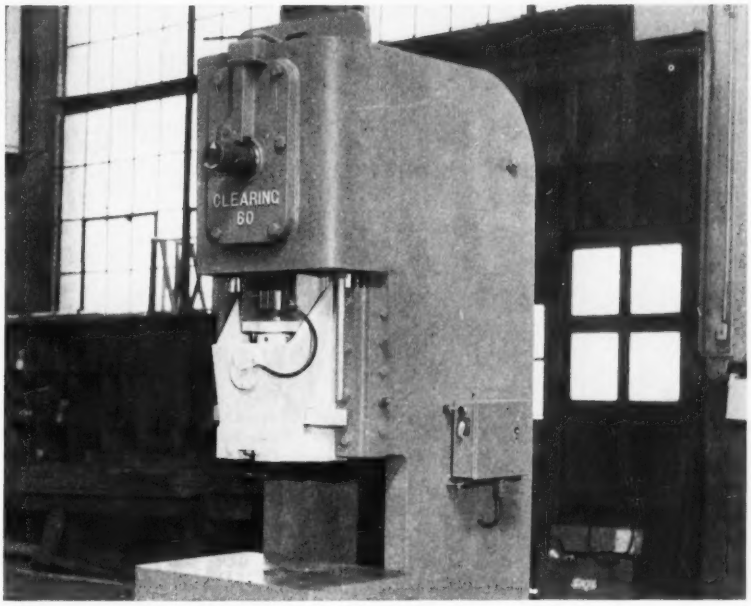
For further information, *write* Stocker & Yale Inc., 21 Green, Marblehead, Mass.

Press Has Interchangeable Frame, Drive, Head

THE MODULAR principle used in the building of the 60 ton Torc-Pac OBI press means that each of the three basic units—frame, drive, and head—are interchangeable types. The principle will solve many maintenance and obsolescence problems, says the company. For example: A replacement drive can serve as a standby unit for an entire shop.

The drive and head units (which comprise all parts of the press except the frame and base) can be used in special press applications. In one instance, a drive and head unit was installed to a building girder. That was done for an operation where a normal press could not work due to shut height limitations.

Bronze friction plates are used. They operate in a sealed-in-oil enclosure. The oil absorbs the shock



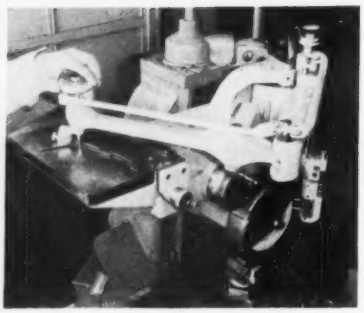
of the pickup load (during engagement). When the clutch is engaged, oil is momentarily trapped between the moving and stationary clutch and brake plates. Sudden closing of the plates places the oil in "shear." Before it can escape completely, oil starts clutch engagement (or setting of the brake).

For further information, *write* Clearing Div., U. S. Industries Inc., 6499 W. 65th St., Chicago 38, Ill.

Wheel Forming Attachment Features Speed, Precision

WITH the Diaform grinding wheel forming attachment, you can form true a job in minutes to a few ten thousandths of an inch, says the maker. Reported time savings range up to 33 per cent.

The unit (Model No. 5) mounts permanently on the spindle head of toolroom grinders. The mounting



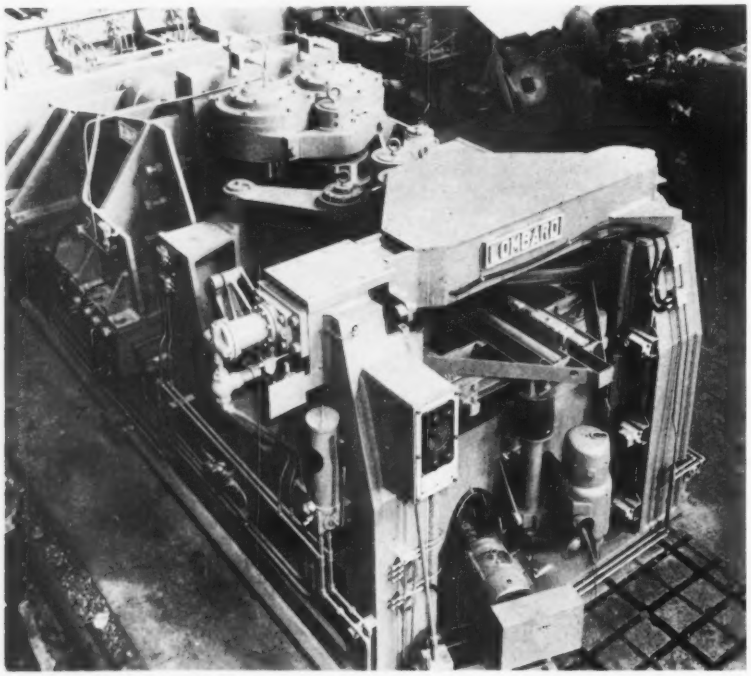
method is designed to make the unit readily available for use without interfering with regular grinding operations.

To use the attachment, a tracer is traversed over the profile of an easily made template. The tracer path is transmitted (at a 5:1 or 10:1 reduction ratio) to diamonds which form true the wheel.

The diamond spindle is a tandem type with one diamond for semifinishing and a second for finish truing. Equalized and increased accurate wear is due to a swiveling diamond spindle, says the manufacturer.

You can get two sizes. Model No. 5-1 is for 6 x 18 in. table working surfaces and will form true wheels up to a 7 in. diameter and 1 in. face. No. 5-2 handles 8 x 24 in. table working surfaces and wheels up to 10 in. in diameter and a 2 in. face.

For further information, *write* Pratt & Whitney Co. Inc., Charter Oak Boulevard, West Hartford 1, Conn.



RING ROLLING MILL receives heated steel rings with a 3 sq in. cross section and inside diameter of 15 in. and automatically delivers a predetermined sectional contour with an outside diameter as high as 50 in. Pressure over 200,000 lb can be applied. Multipass design on the working rolls makes possible increased reduction on any given section with one set of rolls. For further information, **write** Lombard Corp., 639 Wick Ave., Youngstown 1, Ohio

Cutting, Grinding Coolant Has High Work Visibility

HIGH work visibility in cutting and grinding operations is claimed for Kleer-60, a concentrated, soluble oil coolant.

It is designed for high penetration around the cutting edge of a tool or wheel (even at high cutting speeds). It has low surface tension, high extreme pressure characteristics, and superior wetting qualities.

Friction is reduced, and surface finish improved. Chip settling capacity is good, says the company. Tool and wheel life are increased and machine downtime is cut. Fewer tool sharpenings and wheel dressings are required.

The oil is nonfoaming, bacteria static, and noncorrosive to such metals as copper, brass, aluminum, and magnesium. Corrosion is inhibited on finish machined parts.

For further information, *write* Shear-Speed Chemical Products Div., Michigan Tool Co., 7125 E. McNichols Rd., Detroit 12, Mich.

Stock Straightener Comes in Six Models

YOU can put any of the six Dickerman stock straighteners in a space 17 x 18 in. Stock feed ranges from 20 to 80 ft per minute. The portable units hold stock at a 40 in. height.

Coiled stock 4 to 10 in. wide and 0.020 to 0.125 in. thick can be processed. You can obtain models with five or seven straightening rolls and with motor ratings of ½ to 1 hp.

A variable speed control on each unit permits setting operating speed at the most suitable point for automatic press feed. Two motor driven

Get *full* efficiency from manpower and space with a Trambeam Overhead Handling System. No delays from floor traffic . . . no wide aisles necessary . . . dead overhead space becomes a profitable area. Add to these advantages Trambeam *extras*: (1) High-carbon runway and girder rails deliver a smooth ride (2) Double-row tapered roller bearings in wheels reduce downtime, wear longer (3) Rubber drive wheels produce greater tractive effort (4) Hanger rod is ball and socketed at *both* ends to minimize bending fatigue. Whatever your overhead handling needs, call on Whiting for complete *job analysis* and cost-saving recommendations.

FREE BOOKLET . . . See how Trambeam increases storage capacity, speeds handling at famous new award-winning plant! Write for Bulletin M-33 today! *Whiting Corporation, 15643 Lathrop Avenue, Harvey, Illinois.*

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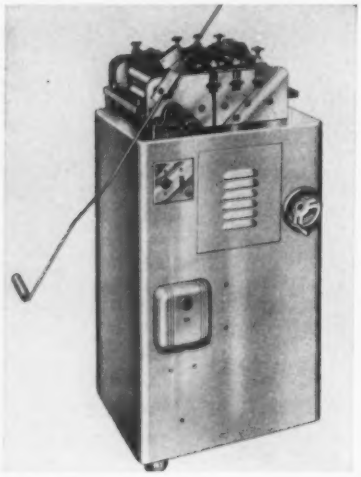


pinch rolls power the lower rolls. Upper straightening rolls are individually adjustable for proper setting.

In addition to removing coil set, the straightener may be used for straightening blanked parts and for deburring shear-slit stock.

For further information, *write* H. E. Dickerman Mfg. Co., 321 Albany St., Springfield, Mass.

Cutting Speed Constant With Lathe Drive Package

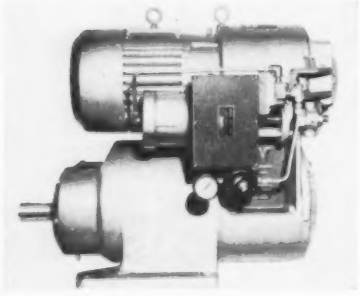
CONSTANT lathe cutting speeds from maximum to minimum work diameters can be maintained automatically with the Reeves packaged adjustable speed drive system.

Here's how: When a cutting tool cuts across a workpiece that has a diameter change, a pneumatic positioner in a pneumatic control unit receives an air signal and then adjusts the drive output speed to correct the spindle rpm. The spindle may also be controlled manually.

You can get the system in sizes from ¼ through 40 hp, 1.7 through 4660 rpm, and in 2:1 through 10:1 speed variations.

The drive package consists of a mechanical variable speed drive, automatic pneumatic control, a three way solenoid valve, a position transmitter, a manual-automatic remote control station, and filter regulators.

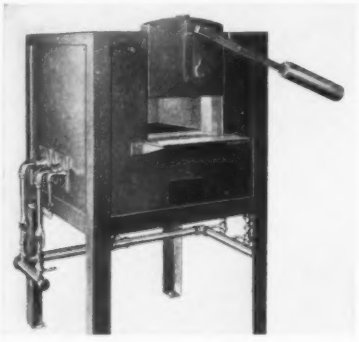
For further information, *write* Reeves Pulley Div., Reliance Electric & Engineering Co., Columbus, Ind.



Furnace Now Operates in Higher Temperature Range

OPERATING temperatures of the Buzzer heat treating furnace (Model No. 1218) have been increased to the 2250 to 2400° F range. Atmospheric gas burners are used in the modified hearth type furnace.

Venturi air mixer burner design eliminates the need for blowers or compressed air equipment. The unit is ready for operation after connection to the gas supply.

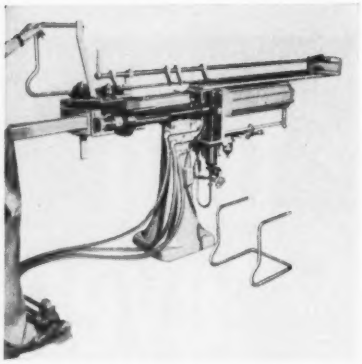


Automatic temperature controls can be supplied. You can also get models for inert atmosphere applications.

For further information, *write* Charles A. Hones Inc., 2473 Grand Ave., Baldwin, N. Y.

Bender Is Equipped with Automatic Indexing Unit

AN AUTOMATIC indexing unit that handles up to six different shaped bends on one piece of tubing (up to 1⅛ in. OD), is one of the improvements claimed for the Bend-Ex bender. Resetting of stops after each bend is eliminated. Settings are made beforehand for continuous operation. Rated capacity: Over 900 bends per hour.



Other improvements: The mandrel support structure has greater rigidity. A pedal replaces a hand lever. A precision follow bar attachment for bending thin wall tubing can be obtained.

The indexer is a self-contained unit. It's operated by a switch and bellows air cylinder which are automatically actuated for the next bend on return strokes of the bending cylinder.

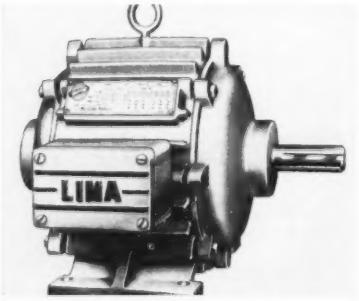
For further information, *write* Paul Machine Tool & Die Works, 4600 S. Kedzie Ave., Chicago 32, Ill.

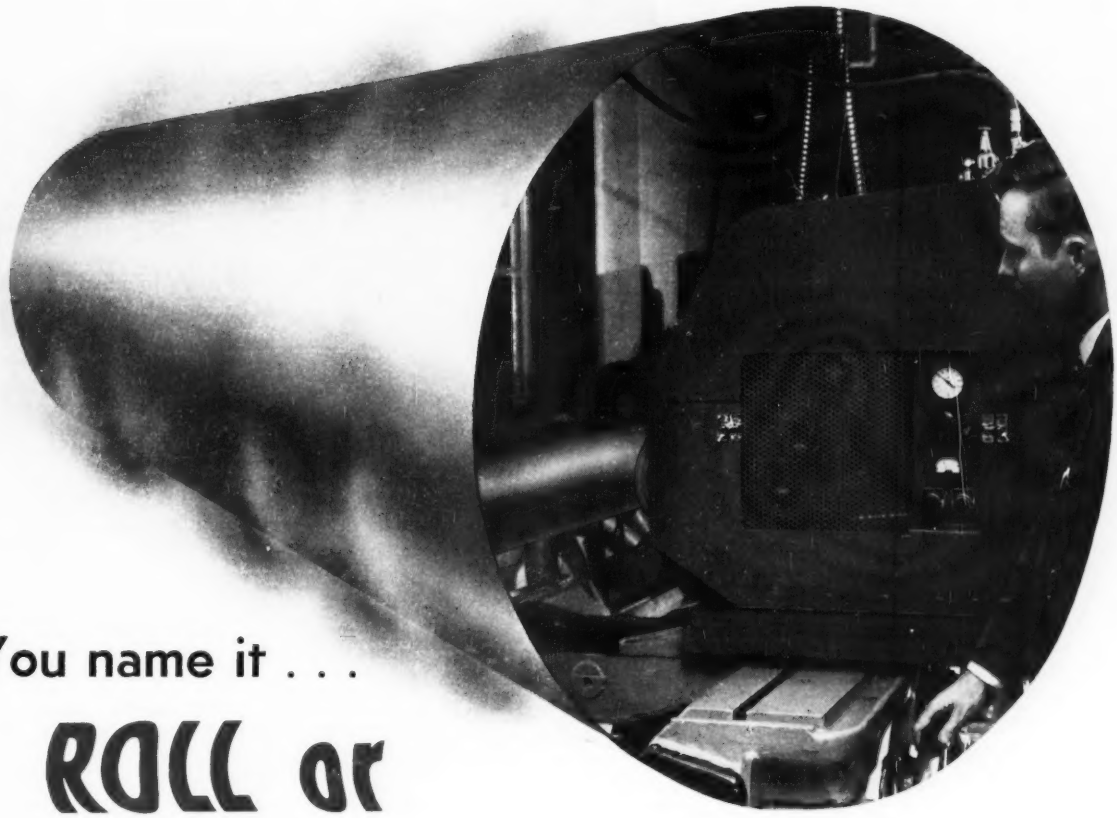
Totally Enclosed Motors Rated ½ Through 15 hp

TOTALLY ENCLOSED Lima fan duty motors (Type EFD) have deep external cooling fins and a reduced transverse section for low air resistance. Cooling surfaces are readily accessible for cleaning. Duty rating is continuous, and temperature rise is rated at 131° F.

You can obtain the motor in rerated NEMA frame sizes 182 through 326U (½ through 15 hp). Speeds of 1800, 1200, or 900 rpm can be furnished. Requirements can be met for two or three phase operation in all standard frequencies and commercial voltages below 600 volts.

Diecast rotors are dynamically





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ROLL or CYLINDRICAL GRINDING

with Coated Abrasive belts reduces "set-up" time

The use of coated abrasive belts for roll or cylindrical grinding is spreading rapidly. New machines are being introduced and many conversions are being installed.

The reason for the popularity of this easy-to-work system is that it gives better finishes and requires less set-up and adjusting time.

Ask your BEHR-MANNING representative how coated abrasive roll or cylindrical grinding can save you time and money — or write direct to Dept. S-10.

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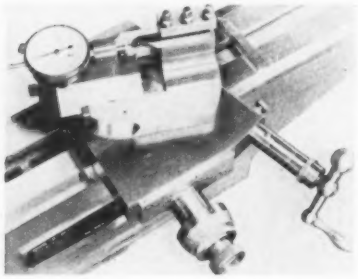
balanced. Windings are heavy multicoated insulated wire with high dielectric and mechanical strength. Stators are impregnated with moisture resisting, thermosetting varnish and baked in temperature controlled ovens.

For further information, *write* Dept. 149, Lima Electric Motor Co. Inc., a subsidiary of Consolidated Diesel Electric Corp., Lima, Ohio.

Radius Turning Attachment Takes 3⅝ in. Diameters

THE Wade radius turning attachment will machine concave or convex surfaces on the axis of a lathe with a single point turning tool. The tool bit is set directly to the desired radius with a dial indicator (it reads in thousandths). Feed is controlled by a worm gear.



Capacity is from 0 to 3⅝ in. diameters, either concave or convex. The beveled edge reads directly in degrees. The attachment (designed for the Wade No. 94 or 10-B lathe) can be adapted to other lathes.

For further information, *write* Wade Tool Co., 49 River St., Waltham, Mass.

Vacuum Valves Are Diaphragm Operated

HIGH flow rates and positive sealing are advantages cited for the Sinclair-Collins line of vacuum valves. Any suitable pneumatic pilot, electropneumatic pilot, or cycle control unit will actuate them, or you can have a remote manual operation setup.

Synthetic O-ring seals and direct metal to metal seat stops help make

the unit capable of sealing and holding a vacuum to within ½ in. of mercury indefinitely, says the maker. Service life is aided by side to side contact of the O-ring with the seat plus a special stem packer design.

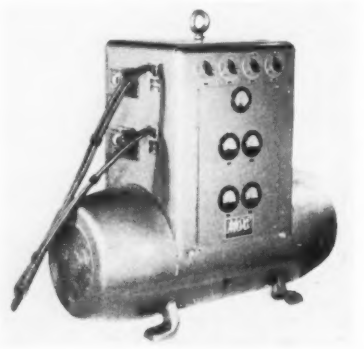
You can get flange or screw mounted two way types (in sizes up to 2 in.).

For further information, *write* Sinclair-Collins Valve Co., 454 Morgan Ave., Akron 11, Ohio.

Generator Charges Batteries Automatically

HAND TRUCK batteries can be charged automatically with Hobart four circuit generators. Motor and generator controls are housed together with four complete charging circuits in a dead front, monitor top control cabinet (an integral part of the motor-generator set).

Each circuit includes a control unit, a ballast resistor, ammeter with shunt, control relay, and line fuse. A heavy duty, dc line contactor provides reverse current protection to the battery and generator. Generator capacities from 3 to 7½ kw are available.



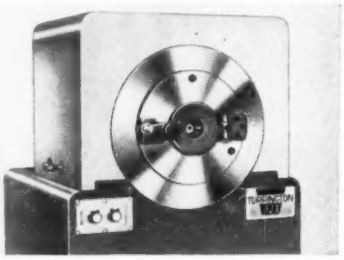
When the batteries are about three-fourths charged, a relay cuts in a clock which times the final three hours. When the last battery cuts off, the set shuts down. Lead-acid batteries take about 8 hours, and nickel-alkaline types take 7 hours.

For further information, *write* Motor Generator Corp., West Water St., Troy, Ohio.

Solid, Tubular Stock Can Be Pointed Fast

SOLID stock up to ½ in. in diameter and tubular material up to 1½ in. in diameter can be handled by the Torrington pointer.

It's designed to handle steel, aluminum, and brass mill applications, particularly where fast pointing and quick die changes are necessary.



Substantial production economies for the machine capacity are claimed.

For further information, *write* Swaging Machine Div., Torrington Co., Torrington, Conn.

Constant Speed Motors Rated from 150 to 2000 hp

HIGH horsepower, constant speed requirements can be met with the Louis Allis line of alternating current induction motors. Ratings range from 150 to 2000 hp at 1800 and 3600 rpm. They're available in open dripproof enclosures.

Applications include high capacity machine tools, conveyors, and punch presses.

Pressure lubrication is standard for 3600 rpm, 1000 hp ratings and larger. It's optional with smaller, slower speed motors. A separate

Salt River Valley Water Users Association,
Phoenix, Arizona

Saves $699.00 per pump...

by using ground and polished

fatigue-proof® STEEL BARS **e.t.d.®**

made by elevated temperature drawing process

The men who operate the "Salt River" project have the job of supplying water to 240,000 acres of land in Arizona, where the Gila River joins the Salt River. The Association maintains some 250 deep well pumps to help supply the required water.

Richard Juetten, Supervisor of Salt River's Pump Division, reports that the use of La Salle FATIGUE-PROOF steel bars has permitted a saving of $699.00 per pump . . . a potential saving of $174,750 when applied to the 250 pumps now in operation.

Mr. Juetten's report follows:

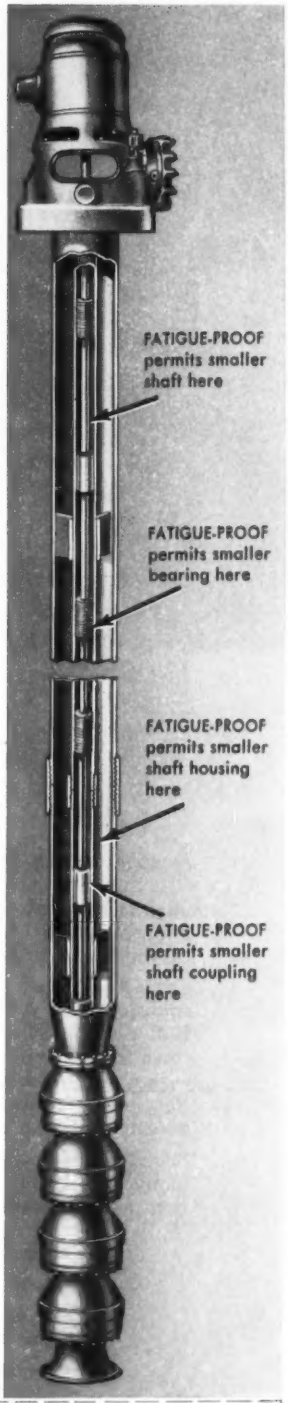
"I have figured our direct saving realized by using La Salle FATIGUE-PROOF steel bars in place of standard C-1045 steel shaft in our deep well turbine pumps.

"FATIGUE-PROOF enables us to use bars only $1\frac{11}{16}$" in diameter . . . instead of $2\frac{3}{16}$" diameter shafts which were necessary when we used C-1045 . . . and this despite higher horsepower, more weight, and additional pump bowl assemblies.

"Here are comparative costs per 10-foot section (of a 300-foot pump shaft):"

using C-1045		using FATIGUE-PROOF	
10' x 2-3/16" dia. shaft	$28.30	10' x 1-11/16" dia. FATIGUE-PROOF	$22.59
3½" shaft housing	26.30	3" shaft housing	19.80
2 bearings, 3½" x 2-3/16"	21.72	2 bearings, 3" x 1-11/16"	13.46
Shaft coupling	5.16	Shaft coupling	2.34
TOTAL cost	$81.48	TOTAL cost	$58.19
Cost per foot	$ 8.15	Cost per foot reduced to	$ 5.82

RESULT: A saving of $2.33 per foot . . . or $699.00 when applied to a 300-foot pump setting. And this doesn't take into consideration reduced power consumption.


FATIGUE-PROOF permits smaller shaft here
FATIGUE-PROOF permits smaller bearing here
FATIGUE-PROOF permits smaller shaft housing here
FATIGUE-PROOF permits smaller shaft coupling here

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Style U Universal Joint Adjustable Heads equipped with Air Counterbalance and 360° Ball Bearing Swivel Attachment give added versatility to any radial drill. Quick setup with positive lock of swivel in aligned position. Fast and accurate operation with minimum operator fatigue.

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motor pressure lubrication system insures oil pressure buildup before starting.

It also insures maintained oil pressure during coastdown.

For further information, *write* Dept. P, Louis Allis Co., Milwaukee 1, Wis.

Permanent Magnet Rail Handles Parts on Incline

EQUIPPING steep inclines with Bosworth permanent magnet rail simplifies transfer of ferrous parts. It is available in 20, 46, 79, and 90 ounce strengths.

Curved and straight sections can be bolted together to obtain desired rail lengths.

You can also get the units in complete Bosworth conveyor belt

systems designed to handle flat parts at a 90 degree angle (or less). In many applications, belt speed may be increased without dropping parts. Some parts can be carried on the underside of belts equipped with magnetic rails.

Rail strength can be revised in the field to meet changing requirements.

For more information, *write* Bosworth Mfg. Co., 34250 Mills Rd., Avon, Ohio.

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Now it takes only 13 minutes to process your industrial radiographs. The Kodak X-Omat Processor produces radiographs of uniform high quality . . . and it brings automation to your darkroom.

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EASTMAN KODAK COMPANY, X-ray Division, Rochester 4, N. Y. 23-10

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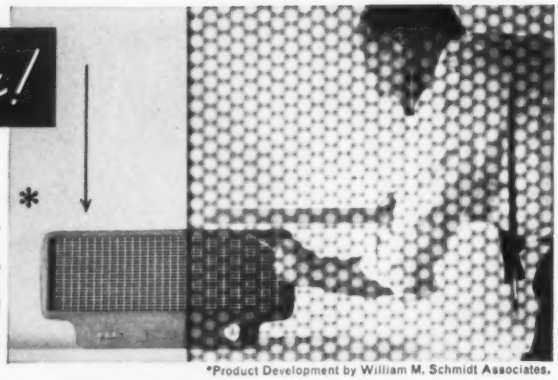

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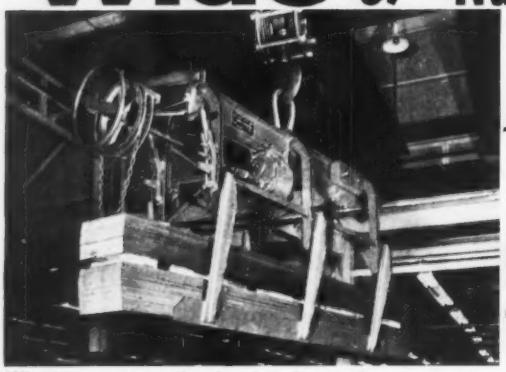

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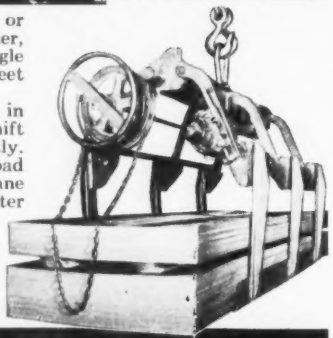
Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.



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NEW literature

Write directly to the company for a copy

Speed Reducers

Two booklets contain engineering data on Hewitt-Robins shaft mounted, in-line helical, and right angle helical speed reducers. Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.

Titanium Machining Techniques

This 32 page manual outlines the dos and don'ts for successful turning, milling, drilling, tapping, grinding, and sawing of commercially pure and alloy grade titanium. Titanium Metals Corp. of America, 233 Broadway, New York 7, N. Y.

Small Basic Switches

Catalog 63, 20 pages, covers four microswitch groups: Type "V3" postage-stamp-sized switches: Type "TB" 2-circuit switches; Type "1SX1" sub-subminiature switches; and Type "SM" subminiature switches. Advertising Dept., Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Plastic Pipe Data

A 16 page technical bulletin describes Ace-Ite, a chemical resistant, general purpose rigid plastic pipe for industrial use. American Hard Rubber Co., 200 E. 42nd St., New York 17, N. Y.

NEW BOOKS

A Simplified Technique of Control System Engineering, George K. Tucker and Doris M. Wills, Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Pa. 303 pages, $5

A nonmathematical approach to an understanding of process control and a graphic method for dynamic analysis of industrial instrumentation systems is contained in this book. It explains the step-by-step operation of a control system, how to improve it, and compares it with different systems. It also tells how to communicate findings to others. It lists numerous short-cut rules and methods for evaluating a control system.

Quenching of Steels, Technical Book Division, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. 77 pages, $2.95

Emphasis is on practical production techniques and problems in this booklet, an important reference text for metallurgists and production personnel. It contains six papers presented as part of the first William Park Woodside Panel Conferences at ASM's 40th National Metal Congress in October, 1958. Covered are such subjects as "The How and Why of Quenching," "Evaluation of Quenching Media," and "Basis of Selection of Quench Media."

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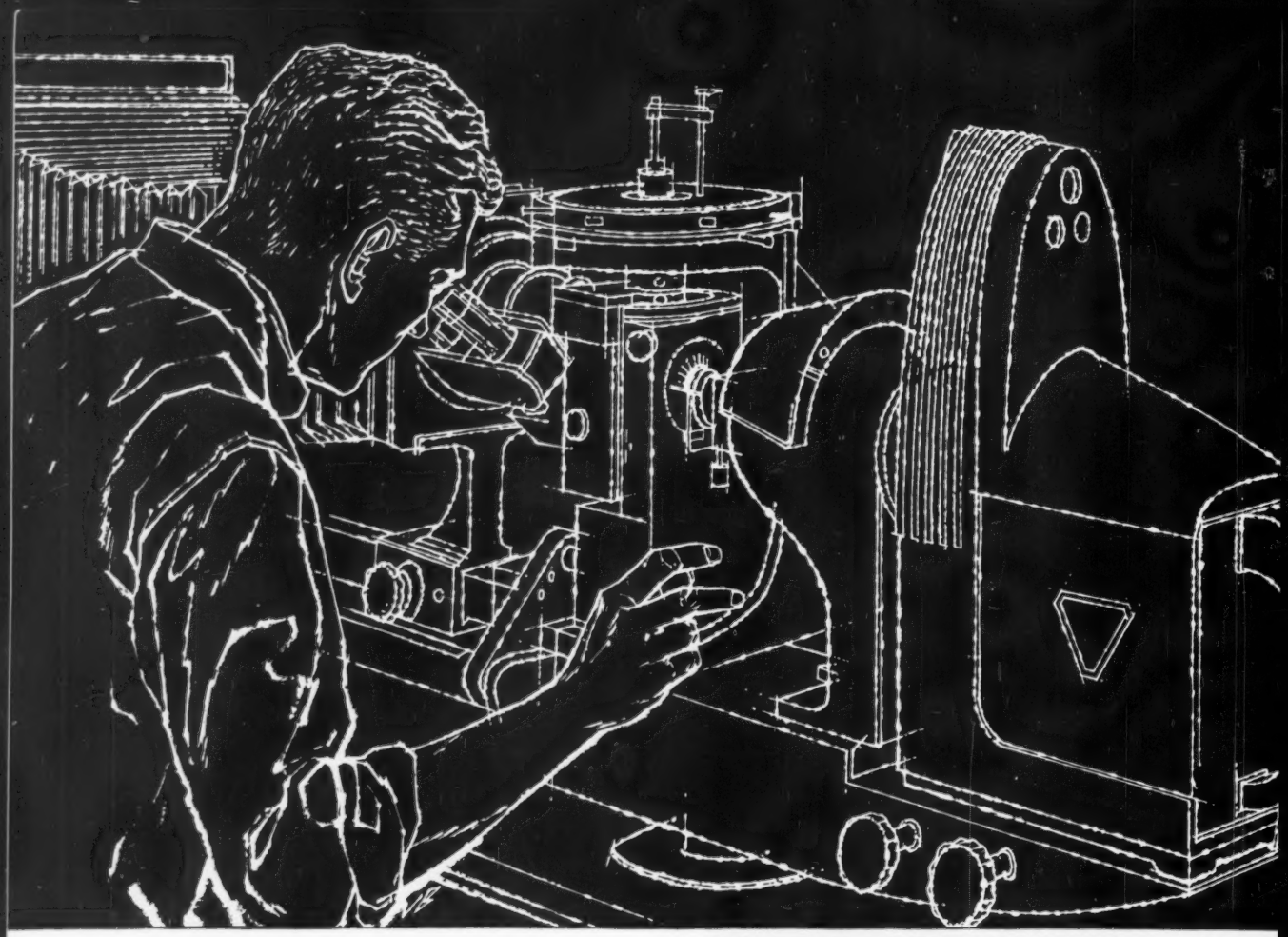

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The microstructure of strip steels can have an important bearing on the fabrication and mechanical properties of many critical components. All of the phases which combine to form the structure of a metal have their own specific properties.

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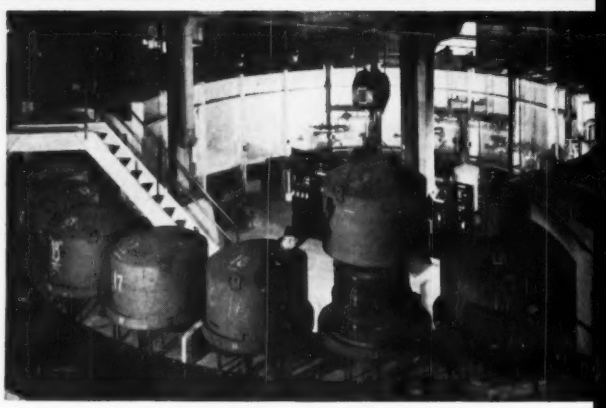

The small unit rotary annealing method assures precision temperature control and develops optimum hardness and microstructure for strip steels.

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October 19, 1959

18 Million Tons on Way if Ike Invokes T-H

HERE'S what you can expect if and when Uncle Sam's good offices bring peace to the steel industry.

Production, currently at 13 per cent of capacity, will edge up to 45 per cent by the end of the first week. By the end of the second it will be at 75 per cent, by the third, 85, and by the fourth, 90 —where it will probably level off.

If the steelworkers return to their jobs this week —voluntarily or under a Taft-Hartley injunction —they'll produce about 27.2 million ingot tons in the next 80 days, 3 million between now and the end of October, 10.7 million in November, 11.3 million in December, and 2.3 million in January.

Finished steel shipments of about 20 million tons are possible. But since there will be little semifinished material in the pipelines at the start, it's probably more realistic to put maximum steel mill shipments at 18 million tons during the cooling off period.

OBSTACLES AHEAD— If startups are slower than expected because of equipment failures, shipments could fall short of the target. Slowdowns by disgruntled workers could also hamstring production. Although some local union leaders have said they'll urge passive resistance to a Taft-Hartley injunction, many steelmakers believe workers won't sacrifice high incentive earnings after so many weeks of unemployment.

TEMPORARY RELIEF— Even if steelmakers ship 20 million tons in the next 80 days, users won't be able to increase their inventories significantly. Shipments will barely exceed consumption. What's more, items shipped may not be what consumers need most. Reasons: 1. The mills that are in running condition will presumably get the ingots. 2. Automakers have so much leverage that it won't be surprising if sheet mills get ingots that were originally scheduled for plates. 3. Steelmakers probably won't shorten rolling cycles to provide speedy availability of sizes and shapes. Changing rolls takes time and penalizes output.

CUTBACKS CONTINUE— Layoffs in the mass production industries are mounting as consumers run out of steel and indispensable parts. At General Motors Corp., furloughed workers reached 25,000 when Chevrolet Div. closed additional engine, frame, and stamping plants. Appliance manufacturers say they can run for a few weeks but freely admit they're worried about slow post-strike deliveries.

Beseiged by anxious users, steelmakers are battling on two fronts. 1. Resisting pressure from customers who want them to look farther than three months ahead. 2. Refusing requests for priority ("Ship us the full quarter's tonnage in the first six weeks").

SCRAP PRICES JUMPING— Because of renewed export demand and an upturn in domestic mill purchases, STEEL's composite price on No. 1 heavy melting scrap jumped $1.33 last week to $44.33 a ton. Sellers are bullish because: 1. Many blast furnaces may be sidelined for repairs during the initial weeks of steelmaking. 2. Ore shortages are likely because lake shipments have been tied up for months.

OUTPUT UNCHANGED— Last week, steelmaking operations held at 13 per cent of capacity. Production was about 368,000 ingot tons.

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*Current prices were published in the Oct. 12 issue and will appear in subsequent issues.

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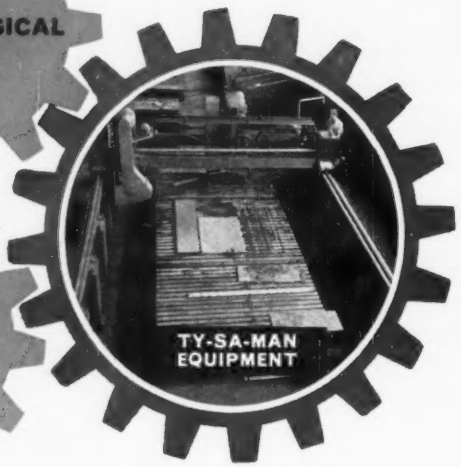

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Enamelstrip Adds Plastic Coating Line

THE TREND to prefinished steel strip continues; a number of producers are expanding their facilities to meet increased demand.

A new, 48 in. continuous processing line is being installed at a cost of $1 million by Enamelstrip Corp., Allentown, Pa., a subsidiary of National Steel Corp. It will increase the company's output of a newly developed plastic coated steel strip. Polyester film applied in the Enamelstrip process is furnished by Di-Noc Chemical Arts Inc., Cleveland.

• The material is adaptable to present production techniques. No special tooling is required.

The coated steel strip, called Miracoil, will permit wider use of automated production methods in many end product manufacturing industries. Material will soon be available in widths up to 48 in. It will be usable as a decorative, protective, wraparound material for refrigerators, ranges, and kitchen cabinets. The company's 32 in. line is turning out material for Sylvania television cabinets.

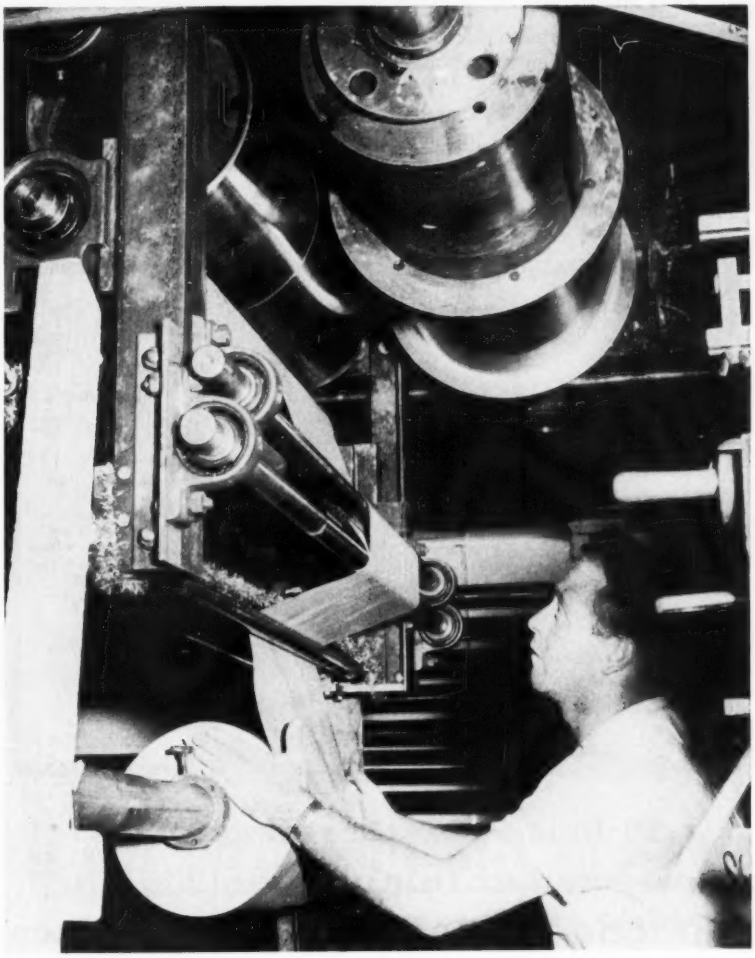
The material, coated on one or both sides, can be put through the same forming operations as uncoated strip. In tests, forming failed to damage the surface even after the steel failed. And dies lasted longer with the new material than with uncoated steel.

Formerly, the plastic material had been applied to steel sheets for decorative applications in auto, home, and office interiors. The material was more expensive, required more handling, and produced more scrap than the continuous coated strip now produced.

• Coated coils make for more efficient manufacturing.

Use of precoated, predecorated material reduces production time. The material can be fed continuously in widths specified by the fabricator. Hand feeding into production equipment, shearing, and slitting are seldom necessary.

Manufacturers will be able to eliminate most or all processing and finishing equipment. Elimination of drying ovens, spray booths, conveyors, and ventilation systems will make more floor space available for other operations. Solvent fumes will be eliminated, and insurance rates will be lowered.



Plastic film is applied to adhesive-coated steel. Film is obtained in roll form, with a paper backing that is often left on until the metal is formed

• Plastic film used in the process won't shrink after forming. It stands up well in adverse environments.

The plastic, developed by a major rubber company, is a nonoriented polyester. It won't shrink back after forming to cause coating failure, or keep design objectives from being reached.

In a process developed by Di-Noc Chemical Arts, the plastic is applied in liquid form to a paper backing; any design can then be printed on the film, in ink.

The film, applied to a metal surface, is highly resistant to humidity and abrasion. It can be sprayed with steam or immersed in boiling water for moderate periods without failure; it shows remarkable stain resistance. The material isn't damaged any more than uncoated steel when sheet metal screws are tightened against it, Enamelstrip engineers say.

• A solid base color, applied to the metal under the plastic film, com-

pletes color tones in the decorative design.

The film had been used to precoat steel sheets. The film was underprinted with the desired design, then backed with a colored base. That formed a sandwich, with the design protected by the plastic film. The laminate was adhesive-bonded to sheet metal.

But thickness of the base often varied, causing differences in color tone. Difficulty in making sheets of uniform color made for high production costs.

In the Enamelstrip application, an unbacked, printed, clear plastic is used. Pigment is added to the adhesive used to fuse the plastic to the steel (the adhesive also serves as a base color). That helps to bring down material and production costs.

The plastic film, in 0.001, 0.002, and 0.003 in. thicknesses, is applied over the adhesive-color base, and the strip is heat cured. Use of thermosetting plastics for the film and adhesive assures long lasting beauty and durability.

• Many colors and designs are available.

Coated coils are available in white that will not fade, yellow, or otherwise deteriorate. Color selection is unlimited.

The film is available in any design that can be photographed, its producers claim. Color of the base (or the pigmented adhesive used at Enamelstrip) can be controlled; various wood, marble, leather, or other finishes can be duplicated.

• Future looks good for coated coils in appliance and manufacturing and other sheet metal applications.

The company's 48 in. processing line will broaden Miracoil's use in the home appliance field, reports Arthur E. Uhleen, Enamelstrip's executive vice president. Sizable gains are expected in the next five years. In that time, most steel companies will probably acquire facilities to precoat steel strip, or arrange to have the work done by another company, Mr. Uhleen feels.

Articles now made of the prefinished steel include appliances, home and office furniture, and accessories. The material will probably be used in automobile interiors and for exterior panels on buses and mobile homes.

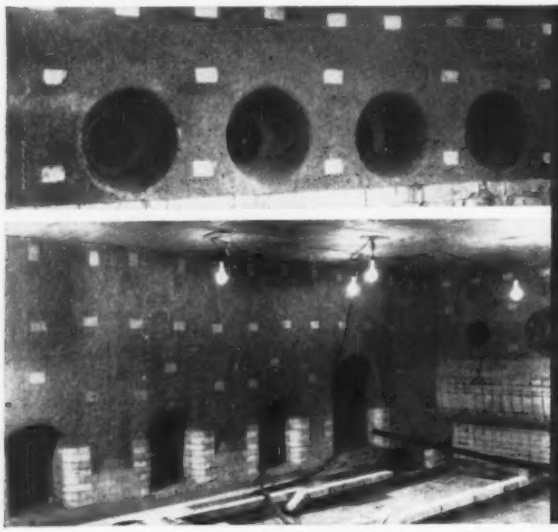
Sheets, Strip . . .

Sheet & Strip Prices, Pages 196 & 197

While most sheetmakers have opened their books for first quarter orders, the bulk of tonnage booked since last July will not be handled until after the turn of the year. The mills will make every effort to protect regular customers, but it will be some time after steelmaking gets underway again before they can make definite shipment promises.

By all odds, sheet supply will be the shortest of all the major steel products over the next several months. The mill carryover from July is the heaviest in flat rolled, and volume of new ordering since the strike started has been substantial.

Right now, consumers are scouring the market for spot tonnage, paying premium prices and accepting substitute specifications in many instances. The mills could book enough orders to keep them going into second quarter next year, if they so desired. Orders for hot and



PLIBRICO "Super" and PLIBRICO "Super F" plastics form a continuous, fully-anchored monolithic lining for the side walls and burner walls, with smooth contours around the door arches and burner cones, in this Salem-Brosius slab reheating furnace.

Plibrico plastic refractories selected at Inland Steel Co. for 130 tons/hr slab reheating furnace

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cold rolled sheets booked prior to the strike (including tonnage in process) are sufficient to keep most producers going over the rest of this year.

More manufacturing plants are being forced to close for lack of steel. That situation will continue even after the mills resume production. An electrical equipment manufacturer says: "We might get through November without cutting back, but it will be touch and go after Nov. 15. Actually, we're more worried about slow deliveries after the strike than we are about our immediate situation."

Although it hasn't bought any foreign steel, another large consumer says it has paid brokers premium prices, double the normal spread between mill and service center quotations, for material that was urgently needed.

Tin Plate . . .

Tin Plate Prices, Page 197

"It's remarkable how well most of the trade has held up in the last 90 days with so few of the tin plate producers operating," says a sales executive at a strikebound mill.

Canmakers are starting to feel the pinch, but the peak in their operations for the year has come and gone. Chances are they'll be able to run for 30 days without curtailment. In some cases, they're making ends meet by changing specifications or by shipping tin plate from one plant to another.

Producers are fighting two battles: 1. Resisting pressure from customers who want them to book further than three months ahead. 2. Refusing requests for priority ("Ship us the full quarter's tonnage in the first six weeks").

The tin plate users who are in greatest jeopardy are the miscellaneous manufacturers who buy the product in coils.

Steel Bars . . .

Bar Prices, Page 195

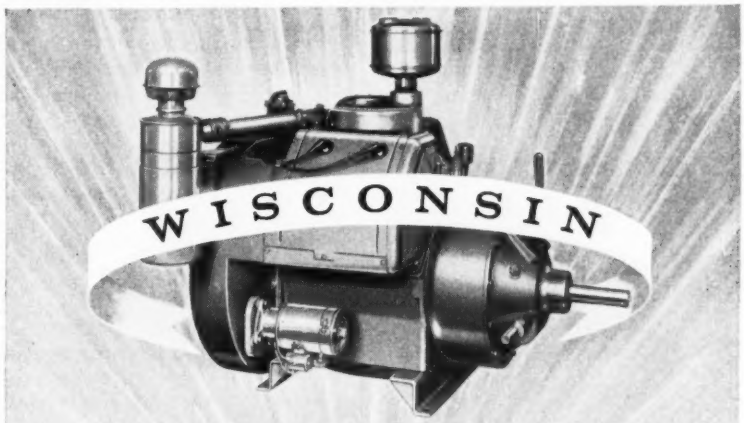
Steel consumers who purchase products subject to rolling cycles, such as bars, may have a long wait for shipments after the mills resume production. It's unlikely that producers will shorten rolling cycles since to do so would hold back operations. Numerous roll changes would consume time and result in needless loss of output.

Inland Steel Co. has frozen its rolling schedules for the first three weeks after steel plants get back into production.

Despite fairly good over-all stocks, gaps have developed in inventories to the point where some consumers of hot carbon bars are having difficulty operating economically. That is resulting in cutbacks which will become more pronounced for a while after the strikebound mills have returned to production.

Enough inquiry is pending to keep the mills busy throughout the first quarter. New carbon bar orders can't be handled before first quarter even though production is begun again in the next few days. Some new tonnage in alloy bars, however, may be shipped before the end of this year, and some cold drawn bar tonnage can still be worked into schedules for shipment during the current quarter.

Producers of cold finished bars report that order entry has slack-



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ened, possibly because some consumers have curtailed their operations, or shut down for lack of other steel products.

The outlook for poststrike delivery of semifinished steel is none too bright. Cold drawers think it will be four to six weeks after the strike before they will get their first deliveries (July orders) from the hot bar mills. Orders placed today probably won't be delivered for four months.

Tubular Goods . . .

Tubular Goods Prices, Page 199

An acute shortage of oil country goods has developed at the distributor level, but most consumers are adequately stocked for at least 30 days. Neither the big oil companies nor the independent drillers have had to curtail operations for lack of steel.

Distributors' stocks of 2⅜ and 2⅞ in. tubing, 4½ to 5½ in. casing, and small pipe used in dual completion drilling programs are nearly exhausted. Producers estimate they'll need four to six weeks to replenish their own field stocks and two or three months to rebuild other distributors' inventories. One company won't rebuild its downriver terminal inventories to more than 50 per cent of prestrike levels.

Steelmakers can no longer ship to distributors on the upper Mississippi. The cutoff date for Kansas City, Mo., was Sept. 15. Tubemakers in Ohio and western Pennsylvania could ship by barge to St. Louis and then switch to rail for the rest of the Kansas City haul, but handling charges would make the trip $2 a ton more costly than an all-rail shipment.

Line pipe users face long delays —especially if they are waiting for the smaller sizes (12 in. OD and under). One producer figures that even if it resumed operations immediately it couldn't ship October tonnage before January or February. When it resumes after the strike, it will start running 10 in. miscellaneous pipe that was on its books before the strike.

Producers of standard pipe are farthest behind schedule on 2 to 4 in. seamless tubes. One maker estimates he's four months behind on shipments.

Rotary drilling operations held

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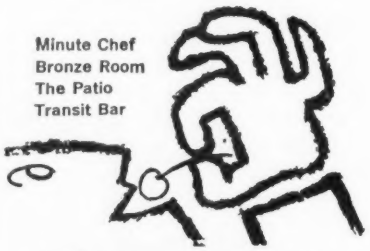

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steady during the week ended Oct. 5 with 2139 rigs working, the same as in the preceding week. The total was 241 above that during the comparable week a year ago.

Plates . . .

Plate Prices, Page 195

Users of wide and heavy plates have tried to buttress their sagging inventories with material purchased from service centers, but supply conditions continue to tighten, and there's little prospect of any substantial improvement in the situation for many weeks after the strike-bound mills get going again.

The chances are consumers will have to wait from three to six weeks after the strike for their first mill shipments. It's feared that supply of plates will remain tight longer than sheets.

Producers are refusing to quote deliveries until they resume production. After selling out for the third quarter, they stopped taking orders.

Some tonnage, including low alloy, high tensile, scheduled for shipment to Naval shipyards in fourth quarter will not be delivered. Inquiry from Naval shipyards for first quarter is reported smaller.

One eastern mill that has been producing during the strike is sold out on carbon plates into first quarter.

Wire . . .

Wire Prices, Pages 197 & 198

Auto seat manufacturers are making desperate efforts to obtain more upholstery spring wire. A strike-free producer in the Pittsburgh area says the pressure from customers is terrific, that "we've been selling everything we could make for the last three months. Orders come in like bolts out of the blue. We've had inquiries from 20 or 30 companies that we've never dealt with, some as far away as Chicago."

Demand for welding wire is firm, but less urgent than it has been. Automakers are insisting on prompt delivery of material they've ordered, but they aren't pressing for additional tonnage. Producers could run at capacity for the next two or three months if they didn't get another order.

A nonintegrated wiremaker figures it has enough billets to con-

WEBSTER

gal-va-nize (găl/və nīz/), *v.t.* 1. to simulate by or as by a galvanic current. 2. to coat (metal, esp. iron or steel) with zinc.

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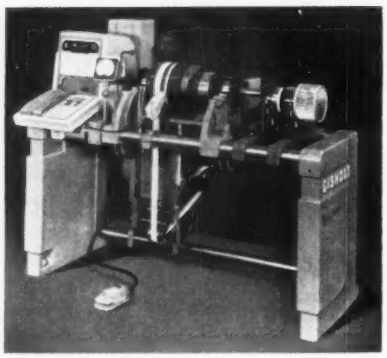

The Gisholt 31S Balancer shown here accommodates an extremely wide range of workpiece weights and diameters...is ideal for production or job-lot operations. Capable of accurately measuring and locating vibratory movements as small as .000025" in one or two correction planes, direct reading amount meter provides quick answers in terms of correction method most suitable to work at hand—for added savings.

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tinue full production through October. However, producers of ingots to be processed into wire rods and drawn wire will be confronted with quality problems in addition to possible damage to long idle furnaces. First heats on resumption of operation will be difficult to control, from two to three weeks being required to attain standard quality.

Distributors . . .

Prices, Page 200

Many users, especially small ones, are being hurt by the growing shortage of steel. The items needed most are scarcest. Service centers are virtually cleaned out of sheets and light plates. There are big holes in stock ranges of bars, bar size angles, and structurals. In the Buffalo area, stocks of common nails are approaching the critical stage.

Inventories in many districts have fallen beyond the point where size and chemical specifications can be substituted. To make matters worse, service centers will be subject to the same arrangement in getting new mill supplies that applies to all other mill customers: Allocation of tonnages.

Importers in the Houston area, anticipating an early resumption of operations under Taft-Hartley provisions, have reduced their asking prices on plates below the domestic market level.

On the Pacific Coast, it will take 30 to 120 days before stocks are back to normal after the mills resume operations. That estimate is based on 30 to 60 day rolling cycles and 30 days for shipment by water from the eastern producing areas.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 201

Production of coke in August totaled 1,582,790 net tons (1,542,545 tons oven, 40,245 beehive), reports the U. S. Bureau of Mines. In the preceding month output was 2,368,834 tons (2,310,106 oven, 58,728 beehive), and in August, 1958, it was 4,324,500 tons (4,283,700 oven, 40,800 beehive).

Output in the first eight months this year amounted to 40,140,398 tons (39,325,354 oven, 815,044 beehive) compared with 33,194,500 tons (32,874,000 oven, 320,500 beehive), in the like period last year.

Stocks of oven coke at the end of August amounted to 2,298,911 net tons, equal to 46.2 days output. At the end of July, the total was 2,195,336 tons (29.5 days), and at the end of August, 1958, it was 4,007,178 tons (29 days).

Contracts to rebuild No. 1 coke oven battery and recondition batteries No. 2 and No. 3 at the Hamilton, Ohio, plant of Armco Steel Corp. have been received by the Koppers Engineering & Construction Div., Koppers Co. Inc., Pittsburgh. Reconditioning of batteries No. 2 and No. 3 is scheduled for completion in mid-1960, and the rebuilt No. 1 battery will be ready for operation later next year.

Salem-Brosius Inc. has been awarded a contract by Carpenterstown Coal & Coke Co., subsidiary of Sharon Steel Corp., Sharon, Pa., for the design and construction of two batteries of 132 beehive coke ovens, a total of 264 ovens.

Structural Shapes . . .

Structural Shape Prices, Page 195

Structural fabricators in some areas are becoming badly pinched for steel. A few shops have suspended completely, and in most cases operations are being cut back. The trend is certain to continue for a time even after the mills resume production.

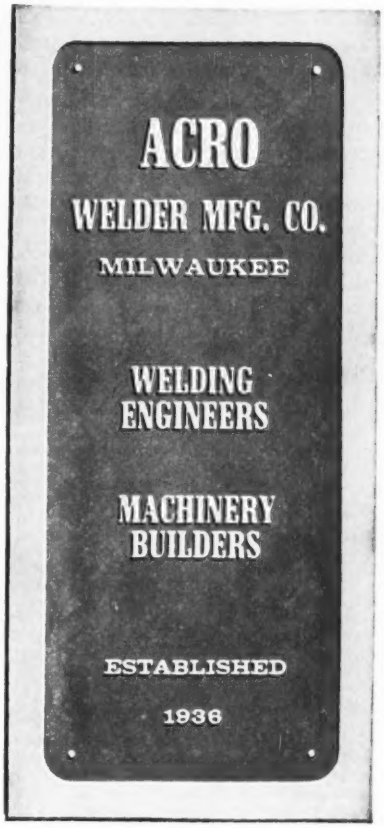
Shops that have been strikebound will be in better position to take on work than those which have been operating. Reason: Their steel inventories are in good shape.

Demand is spotty. Projects are being held up until the steel situation is clarified. However, there's strong competition for work coming out for figures.

Some New England shops are maintaining fabricating cycles only by use of imported structurals, which command premium prices. Bookings of fabricated structural steel in the area were the heaviest this year in the third quarter, and tonnage now up for estimates points to a decline over the rest of the year.

Pennsylvania state bridgework is livelier, with several projects up for bids late this month. Commercial and industrial work are still lagging.

The outlook for highway construction isn't as rosy as it has been. This will affect demand for reinforc-



(Advertisement)

Big press work

Plates up to 9" thick or 40' long can be formed on Foster Wheeler's 8,000 ton beam press. Plates 2" thick or less can be formed to a minimum of 8½" ID. Facilities for stress relieving of welded assemblies include a furnace 15' wide x 83'6" long x 14'6" high, capable of temperatures to 2,100F. These and other Foster Wheeler facilities permit fabrication of pressure vessels, drums, cylinders etc. up to 100' long and 12' diameter. Send for full technical information on these facilities. Foster Wheeler Corporation 666 Fifth Avenue, New York 19, N.Y.

Since this, Baltimore's largest hotel, is normally favored by most visitors, we suggest that you write or teletype BA263 for reservations.

ing steel, wire mesh, structural steel, and other construction products.

Federal funds for interstate routes in Illinois will be cut back 25 per cent in the coming fiscal year, but other federal financed roadwork in the state is not expected to be affected. Illinois has received $127.5 million for interstate highway work during the fiscal year starting July 1, 1959. The state expects to get $92.3 million for the next fiscal year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, lift span, Harlem River, New York, Department of Public Works, New York, to American Bridge Div., U. S. Steel Corp., Pittsburgh; bars, rail, and other steel requirements will be handled through American Bridge Div.

1600 tons, office, research, and manufacturing buildings, Norden Div., United Aircraft Corp., Stamford, Conn., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Wigton-Abbott Corp., Plainfield, N. J., general contractor.

1500 tons, municipal incinerator, Hamilton Ave., Brooklyn, N. Y., through Sovereign Construction Co., general contractor, to Deleson Steel Co., Englewood, N. J.

1090 tons, state highway bridges, Forsyth County, North Carolina, to Carolina Steel & Iron Co., Goldsboro, N. C.; Wilson Construction Co., Inc., Salisbury, N. C., general contractor.

727 tons, state highway structures, North-South Expressway, near Statesville, Iredell County, North Carolina, to American Bridge Div., U. S. Steel Corp., Pittsburgh, and Colonial Steel & Iron Co.; Wilson Construction Co. Inc., Salisbury, N. C., general contractor.

400 tons, structurals and bars, La Reine High School, Suitland, Md., to Barber & Ross Co. Inc., Washington, D.C. (structurals), and Hudson Supply & Equipment Co., Washington (reinforcing steel); Victor R. Beauchamp, Washington, general contractor.

390 tons, one railroad and four state highway bridges, North Smithfield, R. I., to American Bridge Div. U. S. Steel Corp., Pittsburgh; Halloran Construction Co., Providence, R. I., general contractor.

355 tons, state bridgework, FALIE 59-1, Nassau County, New York, through Delillo Construction Co., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

350 tons, marine terminal, Wilmington, Del., through Ernest De Sabatino & Sons Inc., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh; also, 175 tons of joists to the Macomber Co.

265 tons, dormitory and social facility buildings, Princeton University, Princeton, N. J., through John W. Regan Construction Co., New York, general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

260 tons, Public School No. 262, New York, to Bethlehem Fabricators, Bethlehem, Pa.

220 tons, classroom building, University of Maine, Portland, Maine, to Groisser & Shlager Iron Works, Somerville, Mass.; Paul B. McLellan Co., Portland, general contractor; 52 tons, reinforcing bars to Bancroft & Martin Rolling Mills Co., South Portland, Maine.

215 tons, Rehoboth-Dighton Regional High School, Rehoboth, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Dimeo Construction Co., Providence, R. I., general contractor; reinforcing bars to Plantations Steel Co., Providence.

STRUCTURAL STEEL PENDING

3730 tons, steel girder spans, superstructure, West Highway Bridge, Potomac River, near 14th Street, Washington, contract 2-S; bids Oct. 30, Department of Highways and Traffic, District of Columbia; alternate 2-C, concrete box girder spans, latter to include 150 tons, structural steel, 1255 tons, concrete reinforcing bars and 143,700 linear feet prestress strand.

2000 tons, Viaduct Parkway, New York State Power Authority, Niagara Falls, N. Y.; bids Oct. 22.

1834 tons, state bridgework, FARC 59-100, Franklin and St. Lawrence counties, New York; bids closed Oct. 15.

1800 tons, state bridgework, FISH 59-22, Oswego County, New York; bids closed Oct. 15.

1264 tons, state bridgework, FISH 59-18, Saratoga County, New York; bids closed Oct. 15.

1000 tons, state bridgework, Monroe County, Pennsylvania, bids Oct. 29.

1000 tons, parts distribution center, General Electric Co., Zanesville, Ohio.

950 tons, ethylene plant, Magnolia Petroleum Corp., Beaumont, Tex. 1 M. W. Kellogg Co., New York, engineer; bids closed Oct. 5.

918 tons, state bridgework, Jefferson County, Pennsylvania; bids Oct. 28; 109 tons of reinforcing bars also required.

916 tons, state bridgework, FISH 59-19, Jefferson County, New York; bids closed Oct. 15.

850 tons, high school gymnasium, Riverhead, N. Y.; Rice Inc., is low bidder on the general contract.

715 tons, channels, angles, and wide flange sections (five contracts), General Stores Supply Office, Navy, Philadelphia; bids Nov. 2.

700 tons, public school No. 1, Bronx, New York; bids closed Oct. 15.

700 tons, public school No. 155, Manhattan, New York; bids closed Oct. 15.

650 tons, intake gates, New York State Power Authority, Niagara Falls, N. Y.; bids Oct. 22.

625 tons, state bridgework, FARC 59-39, Erie County, New York; bids closed Oct. 15.

500 tons, state bridgework, Dauphin County, Pennsylvania; bids Oct. 29.

360 tons, 18 transmission towers, Buchanan, N. Y., for Consolidated Edison Co., New York.

350 tons, addition, Kleinert Rubber Co., Queens, New York; bids closed.

208 tons, state bridgework, Indiana-Jefferson Counties, Pennsylvania; bids Oct. 28.

274 tons, state bridgework, FARC 59-128, Greene County, New York; bids closed Oct. 15.

265 tons, bridge, Dow Chemical Co., Midland, Mich., Brown Construction Co., Detroit, low on the general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, executive headquarters building, Raytheon Mfg. Co., Lexington, Mass., to Northern Steel Inc., Boston; George A. Fuller Co., Boston, general contractor.

897 tons, 11 state highway structures, Interstate Route 95, Attleboro and North Attleboro, Mass. (three contracts) to Northern Steel Inc., Boston; Campanella & Cardi Construction Co. Inc., Hillsgrove, R. I., general contractor.

755 tons, eight bridges, Chelmsford-Lowell, Mass., to Northern Steel Inc., Boston; Campanella & Cardi Construction Co. Inc., Hillsgrove, R. I., general contractor.

700 tons, eight state highway bridges, Danbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Oneglia & Gervasini Inc., Torrington, Conn., general contractor; 475 tons, steel piles to Bethlehem Steel Co.

680 tons, six highway bridges and ramps, Lynnfield-Peabody, Mass., to U. S. Steel Supply Div., U. S. Steel Corp., Boston; Berke-Moore Co. Inc., Boston, general contractor.

560 tons, three-story plant addition, Melpar Inc., Falls Church, Va., to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., Washington, D. C., general contractor.

510 tons, five state bridges, North Smithfield, R. I., to Truscon Steel Div., Republic Steel Corp., Boston; Halloran Construction Co., Providence, R. I., general contractor.

405 tons, highway structures, North-South Expressway, Forsyth County, North Carolina, to Easterby-Mumaw Inc., Goldsboro, N. C., Wilson Construction Co. Inc., Salisbury, N. C., general contractor.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Oct. 18	Change	Same Week 1958	Same Week 1957
Pittsburgh	2	0	67	80
Chicago	5.5	+ 0.5*	84.5	84
Eastern	11	0	70	82.5
Youngstown	9	0	64	67
Wheeling	56	— 1.5*	82	76
Cleveland	6	0	79.5	88.5
Buffalo	4	0	78	97.5
Birmingham	9	0	66	73.5
Cincinnati	74	+ 3.5*	79.5	86
St. Louis	56.5	— 4	98.5	94.5
Detroit	24.5	— 2.5*	82	99.5
Western	6	0	75	92
National Rate	13	+ 0.2*	74	81

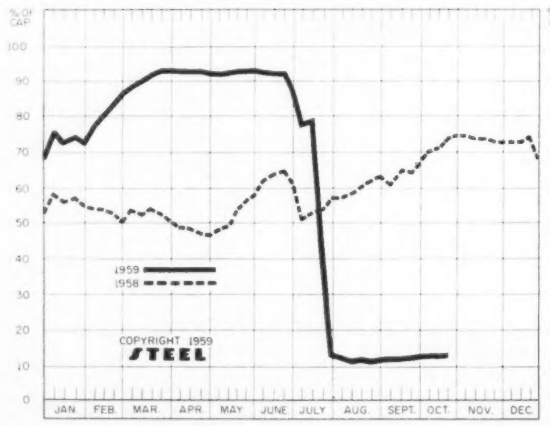
INGOT PRODUCTION

	Week Ended Oct. 18	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	22.9†	22.5	22.2	124.7
NET TONS (In thousands)	368†	362	356	2,003

*Change from preceding week's revised rate. †Estimated by STEEL; comparative figures reported by AISI.

Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites

Oct. 13, 1959	Week Ago	Month Ago	Sept. Index	Year Ago
186.8	186.8	186.7	186.7	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets C.R., Carbon	7.300
Sheets, Galvanized	8.695
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.583
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.772
Woven Wire Fence (20-rod roll)	21.847

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 14 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	246.65	194.53
Index in cents per lb	6.713	6.713	6.713	6.682	5.270

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.28	$117.95
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	44.33	43.00	41.00	42.33	32.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 14 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.30	$9.05

*Including 0.35c for special quality.

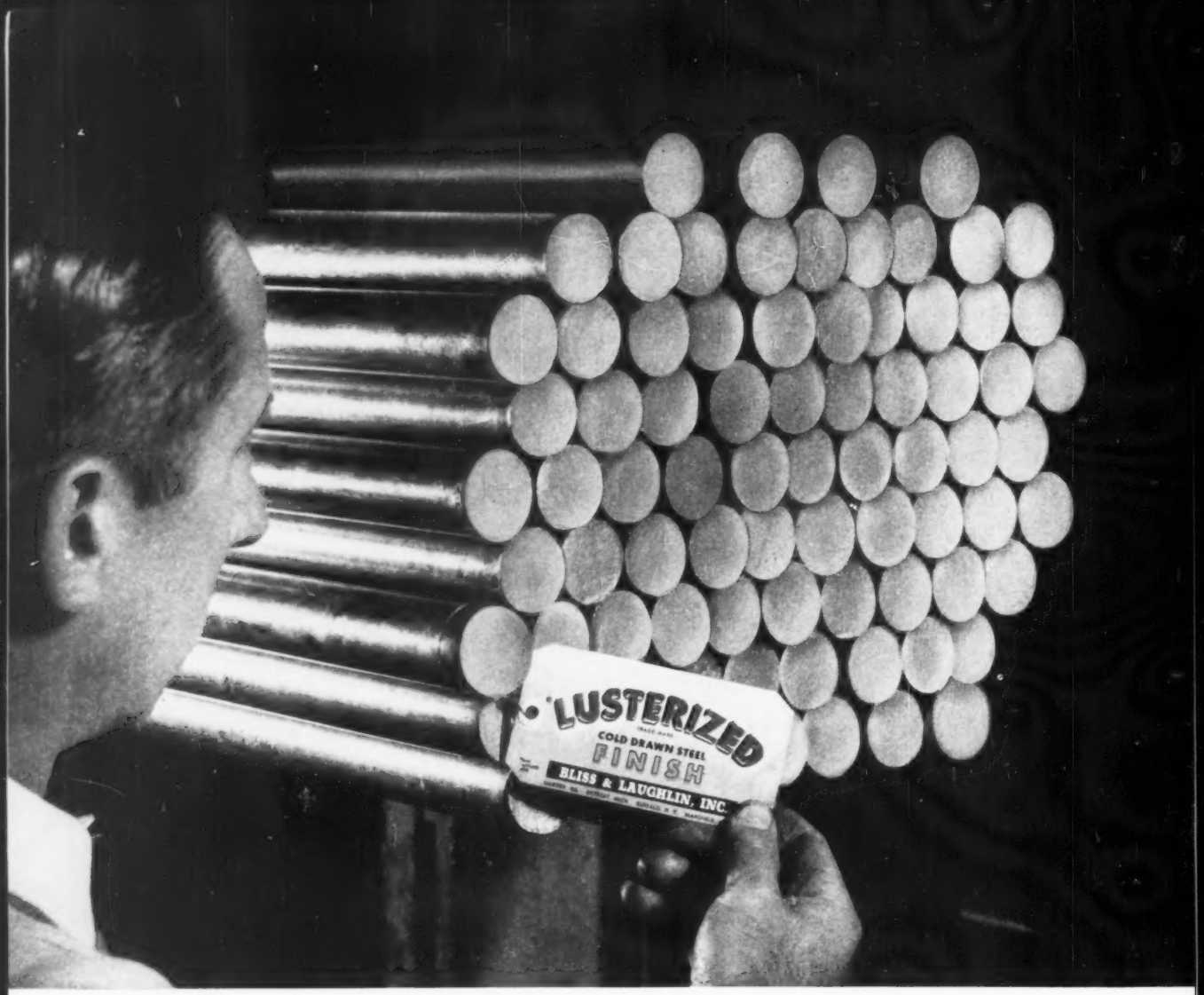
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods ⅜-⅝" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Oct. 14 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$44.50	$44.50	$41.50	$43.50	$32.50
No. 1 Heavy Melt, E. Pa.	45.00	44.00	41.00	41.00	30.50
No. 1 Heavy Melt, Chicago	43.50	40.50	40.50	42.50	33.00
No. 1 Heavy Melt, Valley	44.50	44.50	41.50	43.50	35.00
No. 1 Heavy Melt, Cleve.	41.50	41.50	38.50	40.00	32.00
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	35.50	30.50
Rails, Rerolling, Chicago	64.50	64.50	62.50	62.50	52.50
No. 1 Cast, Chicago	57.50	56.50	55.50	45.50	39.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



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These benefits are realized immediately when you take advantage of the big difference in cold drawn steel bars—the exclusive Bliss & Laughlin Lusterized Finish difference:

The absence of drawing oils, lime and processing grit smooths out production runs, keeps automatic screw machine collets and collet sleeves free from clogging and enhances tool life. The Lusterized surface requires no machining for many parts. Pre-production handling is less messy, thanks to a Bliss & Laughlin inspired contamination-resistant protective oil.

Another development from nearly 70 years of research and leadership in producing cleaner and brighter cold finished steel bars, the exclusive Bliss & Laughlin Lusterized Finish costs no more. All Lusterized carbon bars conform to the new, closer tolerances recently announced by Bliss & Laughlin, too. That is why it pays doubly well to specify Bliss & Laughlin Lusterized Finish.

If the benefits of Lusterized Finish have not been demonstrated for your production, a visit with a Bliss & Laughlin representative will be rewarding. There is a good chance that the big difference in cold drawn steel bars can make a big difference in your production, also. Why not write or phone your Bliss & Laughlin representative now?

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BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

Steel Prices

Mill prices as reported to STEEL, Oct. 14, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 196; footnotes, page 198.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ..80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ...109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ...140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer, Ala. T2 ....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1 5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATFS, Carbon Abras. Resist.
Claymont Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa.(9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa. (9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ..5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1 5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3, N14..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12..5.675
Torrance Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.275
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. R2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14 8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES: S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2. 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5, C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ....11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex(4)(26)T4 .5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 .. 14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.06
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 .6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.825	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.825	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.575†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel ofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2 M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.06	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.06	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	....	18.85	22.95	27.80
Buffalo W12	....	18.85	....	....
Fostoria,O. S1	....	19.05	22.15	....
FranklinPark,Ill. T6	....	19.20	23.30	28.15
Harrison,N.J. C18	....	18.85	22.95	27.80
NewYork W3	....	18.85	22.95	27.80
Palmer,Mass. W12	....	18.85	....	....
Trenton,N.J. R5	....	18.85	22.95	27.80
Worcester,Mass. A7, T6	....	18.85	22.95	27.80
Youngstown S41	....	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.45
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.96
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	....	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	..	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	....	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	....	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	....	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	....	9.875*	11.70	12.40	13.56	14.65
Warren,O. R2	....	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg, Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago, Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonsville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193••
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield, Ala. T2	193†
Houston S5	198••
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill A7	193†
KansasCity,Mo. S5	198••
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198••
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193••
S.SanFrancisco C10	213•
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187••
Allq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192••
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192••
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192••
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187••
Sterling,Ill.(7) N15	192

WIRE (16 gage)

	An'ld Galv.	Stone
Ala.City,Ala.R2	17.85	19.40••
Allq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65••
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65••
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75••
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55••
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80••
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansCity(48) S5	9.25 9.80••
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55••
S.SanFran. C10	9.95 10.50••
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)	N15 9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc price of: •13.50. †5c. ‡10c. ††Less than 10c. ‡‡10.50c. §§11.00c. ••Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:

3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
⅝ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:

3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:

6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:

6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated, Spec. (ASTM A-325, in bulk, Full keg quantity)

⅝ in. diam	50.0
⅞ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

⅜ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

⅜ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1⅛ in., incl.	57.0
1¼ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0

Longer than 6 in.:

⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
New Haven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer, Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N. Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon, Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	**+3.25**	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown S2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.10	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville Homestead, Wilmerding Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.50§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.87[a]	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76[a]	52.33	10.30[c]	8.64[d]	11.25#	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.
[a]10 Ga.; [b]20 Ga.; [c]¼ x 1 in.; [d]⅜-2½ in.; [e]½ x 84 in.; [f]¼ x 36.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo. Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa. $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Canadian Steel

(Cents per pound, f.o.b. mill, except as othewise noted)

Billets, Blooms & Slabs:
Carbon Forging Quality (net ton) $97.00
Alloy (net ton) ... 115.00

Wire Rods:
Carbon, ⅜" to under ¼ in. 5.30
Carbon, ¼ in. to 47/64 in. 5.70
Alloy 6.40

Wire (carload lots) .. 8.40

Bars & Small Shapes:
Carbon, merchant quality 5.40
Carbon, special quality 5.85
Alloy 6.40

Bar Mill Bands:
Carbon 5.40
Alloy 8.05

Structural Size Angles & Zees 5.40

Plates:
Carbon 5.45

Sheets & Coils, Hot Rolled:
Carbon Sheets 5.00
Carbon Strip 5.00

Sheets & Coils, Cold Rolled:
Carbon Sheets 6.35
Carbon Strip (0.080 and lighter) 6.35
Carbon Strip (0.081 and heavier) 6.65

Sheets & Coils, Galvanized:
Standard Quality .. 6.70
Culvert Quality ... 7.00

Sheets, Porcelain Enameling 7.45

Sheets & Coils, Electrical:
Field Grade 9.00
Armature Grade .. 9.50
Electrical Grade .. 10.15

Tin Mill (Per Base Box; **Products** 100 lb basis wt)
Coke Tin Plate (1.25 lb pot yield) $10.60
Electrolytic Tin Plate (0.25 lb coating) .. 9.10
Black Plate 8.30

Nails, c.l. lots, (per keg) **400 keg min.** $8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags ...	11.25
100 mesh, pails ...	9.10‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments,	
⅛ in. x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)..	59.00
Powder Flake (minus 16 plus 100 mesh).	29.00
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade,	93.00-290.00 in standard 200-lb containers; all minus 200 mesh.
Aluminum:	
Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.20-50.70†
Bronze, 5000-lb lots	52.10-56.10†
Copper, electrolytic ..	14.25*
Copper, reduced ...	14.25*
Lead	7.50*
Manganese, Electrolytic:	
Minus 50 mesh ...	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	52.70-57.10†
Phosphor-Copper, 5000-lb lots	64.50
Copper (atomized) 5000-lb lots	45.00-53.50
Solder	7.00*
Stainless Steel, 304 ..	$0.89
Stainless Steel, 316 ..	$1.07
Tin	14.00*
Zinc, 5000-lb lots.	19.20-32.40‡
Tungsten:	Dollars
Carbon reduced, 98.8% min, minus 65 mesh	nom**
Chromium electrolytic 99.8% Cr, min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ..	$6.18	....	$6.13	$6.04	$6.41
Bar Size Angles	6.18	....	6.13	6.04	6.41
Structurals Angles	6.03	....	5.98	5.88	6.28
I-Beams	6.03	....	5.98	5.88	6.28
Channels	6.03	....	5.98	5.88	6.28
Plates (basic bessemer)	5.95	....	5.90	5.80	6.20
Sheets, H.R.	9.00	....	8.95	8.85	9.25
Sheets, Galvanized, 20 Ga., 36 in. x 96 in. ...	9.90	....	9.85	9.75	10.25
Sheets, Galv. (in coils) 20 Ga., 48 in. wide ..	10.05	....	10.00	9.90	10.30
Sheets, C.R. (drawing quality)	10.00	....	10.95	10.85	11.25
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.50	....	25.28	24.99	26.68
Barbed Wire (†)	8.00	....	7.95	7.85	8.25
Merchant Bars	6.18	....	6.13	6.04	6.41
Hot-Rolled Bands	8.90	....	8.85	8.75	9.15
Wire Rods, Thomas Commercial No. 5	6.40	....	6.40	6.25	6.60
Wire Rods, O.H.	6.90	....	6.90	6.75	7.10
Bright Common Wire Nails ($)	8.40	....	8.45	8.35	8.75

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. §Per 100-kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer $11.60
Mesabi nonbessemer 11.45
Old Range bessemer 11.85
Old Range nonbessemer 11.70
Open-hearth lump 12.70
High phos 11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65% ..... 21.00†
Brazilian iron ore, 68.5% 22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality ..... $16-$17†
Domestic, concentrates f.o.b. milling points ..... 16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88.5-91.5c, nom. per long to unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1 ..... $42.00-44.00†
48% 2:8:1 ..... 38.00-40.00†
48% no ratio ..... 29.00-31.00†

South African Transvaal

44% no ratio 19.75-21.00
48% no ratio 29.00-31.00

Turkish

48% 3:1 ..... 51.00-55.00†

Domestic

Rail nearest seller

18% 3:1 ..... 30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55% $2.25-2.40
60-65% 2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic 31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace $14.75-15.25
Connellsville, Pa., foundry 18.00-18.50

Oven foundry Coke

Birmingham, oven $30.35
Cincinnati, deld. 33.34
Buffalo, ovens 32.00
Detroit, ovens 32.00
Pontiac, Mich., deld. 33.95
Saginaw, Mich., deld. 35.53
Erie, Pa., ovens 32.00
Everett, Mass., ovens:
New England, deld. 33.55*
Indianapolis, ovens 31.25
Ironton, Ohio, ovens 30.50
Cincinnati, deld. 33.54
Kearny, N. J., ovens 31.25
Milwaukee, ovens 32.00
Neville Island (Pittsburgh), Pa., ovens 30.75
Painesville, Ohio, ovens 32.00
Cleveland, deld. 34.19
Philadelphia, ovens 31.00
St. Louis, ovens 33.00
St. Paul, ovens 31.25
Chicago, deld. 34.68
Swedeland, Pa., ovens 31.00
Terre Haute, Ind., ovens 31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene 31.00
Xylene, industrial grade 29.00
Creosote 24.00
Naphthalene, 78 deg 5.00
Toluene one deg (deld. east of Rockies). 25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade 14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade $32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N.Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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Scrap Price Uptrend Is Resumed

STEEL's composite on No. 1 heavy melting grade advances $1.33 a ton to $44.33. Rise reflects strength stemming from expectations of heavy requirements soon

Scrap Prices, Page 206

• **Chicago** — Resumption of steelmaking, either by a negotiated settlement or through Taft-Hartley action is considered imminent. Optimism expressed along those lines has put new steam into the market. Leading steelmaking grades are up $1 to $4 a ton. Brokers and dealers are not anxious to sell.

• **Philadelphia**—Prices on most of the major grades of open hearth scrap have advanced $1 a ton. Reasons: Domestic buying and resumption of pressure for export tonnage. No. 1 heavy melting steel is now quoted $45, delivered, No. 2 heavy melting, $39, and No. 1 busheling and No. 1 bundles $47. Electric furnace bundles are nominally higher at $48 delivered, and short shoveling turnings at $27.

• **New York** — Though brokers' buying prices are unchanged, the market is strong. Foreign requirements are active, and domestic mills in operation are pressing for tonnage.

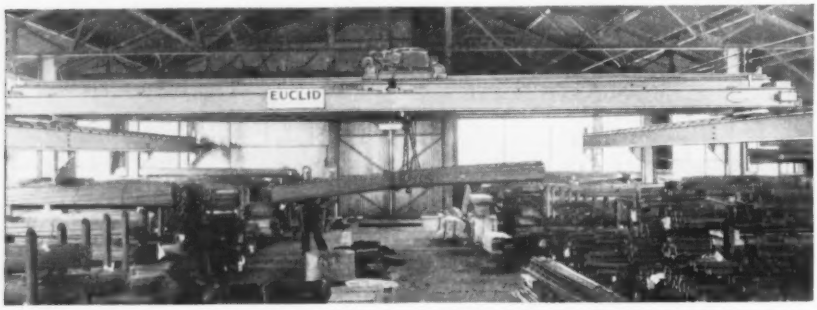
• **Pittsburgh**—Dealers are holding out for higher prices, confident that government action will soon result in resumption of steelmaking. Bullish sentiment is based on two factors: 1. Many blast furnaces may be sidelined for repairs for sometime. 2. Ore shortages are likely.

Foundries, heavily dependent on steel mill customers, are operating at only half of capacity. Despite poor business, they're buying small quantities of scrap because inventories are low and prices are trending upward.

• **Cleveland**—The market is bullish in anticipation of active demand once steelmaking operations are resumed at strike-idled plants. It's thought that steelmakers will probably use more scrap in their melts next spring as an ore conservation measure. This could mean that large tonnages of dealer scrap will move over coming months, including No. 2 bundles, which have been hard to dispose of at times.

• **Youngstown**—Good buying is expected here once the steel plants resume operations. Some dealers think No. 2 material will be in strong demand to fill the need for metallics this winter and spring, especially should iron ore shortages be experienced by the mills.

• **Detroit**—A lot of talk but little action is reported in this market. Brokers claim they expect to see a flurry of activity if steel plants get back into production quickly, but they do not anticipate $5 and $6 per ton increases as suggested by dealers. Recent purchases include sheet clips from Ford at $42. Other



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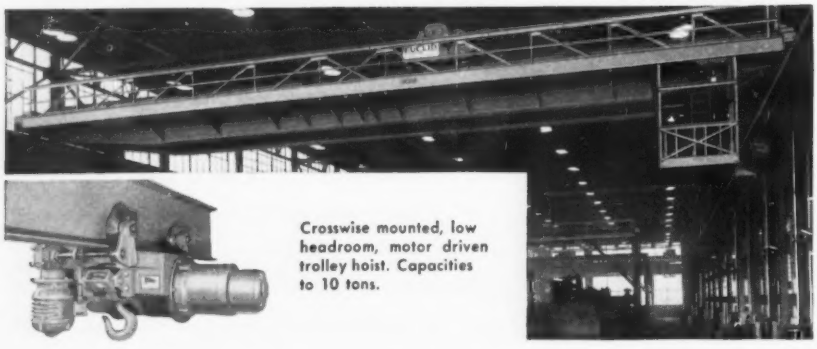

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lots of sheet clips have gone at prices ranging $39-$40.50. Some small tonnages of heavy melting steel are moving on a Canadian order at a reported price of $40.50 delivered.

• **Buffalo**—Some dealers say the market is nominally higher by $2 to $3 a ton, but there have been no recent buys to provide a test. Until the mills re-enter the market, prices will be largely nominal. Prices on the cast iron grades appear to have leveled off after the recent rise.

• **Cincinnati**—The market is strong despite the absence of active demand. Expected resumption of steelmaking is generating hopes of an early pickup in buying.

• **St. Louis**—Demand is strong. A spurt in prices is expected when steelmaking is resumed throughout the country. Also contributing to strength in the local market is the conversion deal between Scullin Steel Co. and Granite City Steel Co. It is expected to result in calling for substantial tonnages of scrap.

• **Birmingham**—Market activity increased last week as a large electric furnace plant and the Atlanta steel mill returned to the market for their October requirements. Prices on electric furnace scrap are unchanged, but the Atlanta mill increased its buying price for No. 2 steel $2 a ton.

Exports are stronger, with No. 1 heavy melting bringing $43 at South Atlantic and Gulf ports, and No. 2 heavy melting $39.

• **Houston**—Export demand and a purchase by the Monterrey, Mexico, mill feature the market in this area. Export prices are unchanged at $39 for No. 1 heavy melting steel f.a.s., but in Baton Rouge, La., $43 is quoted on No. 1, $40 for No. 2, and $30 for No. 2 bundles. South Texas brokers are quoting $46 for No. 1, and $43 for No. 2 heavy melting for delivery to the border.

• **Los Angeles**—The market undertone is stronger, and some dealers are talking higher prices. Big inventories, however, may hold advances in check.

• **San Francisco**—Some dealers report they are selling top grade scrap for export at $2 to $4 a ton above buying prices posted by mills.

• **Seattle**—The market is inactive, but dealers anticipate resumption of buying shortly. The yards are well stocked, and mill inventories are ample. Export business lags.

Pig Iron . . .

Pig Iron Prices, Page 200

Merchant pig iron is moving fairly well. Despite the steel labor situation most foundries have been maintaining a good rate of operation and, accordingly, are consuming iron in reasonably substantial quantities. Supplies are ample and no shortages are expected to develop.

Not only is there enough domestic iron to meet requirements, but foreign iron is available in many districts at prices $5 to $10 a ton under the domestic market. September arrivals at Philadelphia, for instance, comprised 4921 tons of foundry iron from Holland and 2000 tons, largely malleable, from Spain.

Textile machinery builders in New England are pouring castings about 65 per cent over last year's rate. Machine tool builders and jobbing shops also are moderately more active.

Extensive damage may have resulted in some blast furnaces and open hearths during the prolonged strike. That will slow return to capacity operations. Another hindrance to blast furnace operators this winter may be a shortage of ore.

Power Sparks Expansion In Niagara Frontier Area

Increased power availability is generating a sharp expansion of industrial facilities in the Niagara Frontier area. The New York State Power Authority recently allocated 200,000 kilowatts of expansion power from the Niagara project to 13 basic industries in the area. It reports $170 million in expansion and 3100 permanent jobs will result.

Hooker Chemical Corp. announced a $100 million expansion of its international facilities, a large share of it being earmarked for the Niagara Frontier. Its program includes substantial expansion of facilities for producing chlorine, caustic soda, caustic potash, phenol, phosphorus, and their derivatives; synthetic resins and molding compounds; new chemical products and plastics.

It's reported that the Great Lakes Carbon Co. plans expansion of facilities for the manufacture of graphite electrodes. The Pittsburgh Metallurgical Co. is also planning to add a furnace at its College Ave. plant, Niagara Falls, that will equal in size the seven electric furnaces now there.

Olin Mathieson Chemical Corp. has broken ground for a $6 million expansion of its Buffalo Ave. facilities. To some extent, they will offset the closing of the government owned Model City plant which had been operated by Olin Mathieson.

The Carborundum Co. will expand all its divisions in the Niagara Falls area when additional power becomes available.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Oct. 14, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 14	$44.33
Oct. 7	43.00
Sept. Avg.	41.25
Oct. 1958	42.25
Oct. 1954	32.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	45.00-46.00
No. 2 bundles	31.00-32.00
No. 1 busheling	*44.00-45.00*
No. 1 factory bundles	52.00-53.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals:	
2 ft and under	*51.00-52.00*
3 ft and under	*50.00-51.00*
Heavy turnings	35.00-36.00
Punchings & plate scrap	*52.00-53.00*
Electric furnace bundles	50.00-51.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	46.00-47.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	47.00-48.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Random rails	59.00-60.00
Angles, splice bars	56.00-57.00
Railroad specialties	56.00-57.00
Rails, rerolling	65.00-66.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*44.00-45.00*
No. 1 hvy melt., dealer	*42.00-43.00*
No. 2 hvy melting	*39.00-40.00*
No. 1 factory bundles	*48.00-49.00*
No. 1 dealer bundles	*42.00-43.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling, indus.	*44.00-45.00*
No. 1 busheling, dealer	*42.00-43.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*26.00-27.00*
Short shovel turnings	*26.00-27.00*
Cast iron borings	*26.00-27.00*
Cut structurals, 3 ft	50.00-51.00
Punchings & plate Scrap	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	*57.00-58.00*
Stove plate	52.00-53.00
Unstripped motor blocks	*48.00-49.00*
Clean auto cast	*63.00-64.00*
Drop broken machinery	*63.00-64.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*
R.R. malleable	*65.00-66.00*
Rails, 2 ft and under	*63.00-64.00*
Rails, 18 in. and under	*64.00-65.00*
Angles, splice bars	*57.00-58.00*
Axles	*57.00-58.00*
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles, solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	28.00-29.00
No. 1 busheling	46.00-47.00
No. 1 bundles	46.00-47.00
No. 2 bundles	28.00-29.00
Machine shop turnings	18.00-19.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	47.00-48.00
Electric furnace bundles	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00

CLEVELAND

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	28.00-29.00
No. 1 factory bundles	46.00-47.00
No. 1 bundles	42.00-43.00
No. 2 bundles	26.00-27.00
No. 1 busheling	42.00-43.00
Machine shop turnings	15.00-16.00
Short shovel turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut foundry steel	41.00-42.00
Cut structurals, plate 2 ft and under	51.00-52.00
Low phos. punchings & plate	43.00-44.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	41.00-42.00
Heavy breakable cast	41.00-42.00
Stove plate	47.00-48.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	58.00-59.00
Burnt cast	40.00-41.00
Drop broken machinery	55.00-56.00

Railroad Scrap

R.R. malleable	66.00-67.00
Rails, 2 ft and under	61.00-62.00
Rails, 18 in. and under	62.00-63.00
Rails, random lengths	55.00-56.00
Cast steel	49.00-50.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	55.00-56.00
Angles, splice bars	55.00-56.00
Rails, rerolling	70.00-71.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	43.00
No. 2 bundles	26.00
No. 1 busheling	43.00
Machine shop turnings	19.00
Short shovel turnings	21.00

Cast Iron Grades

No. 1 cupola	54.00
Charging box cast	45.00
Heavy breakable cast	44.00
Unstripped motor blocks	44.00
Clean auto cast	56.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00*
Rails, 18 in. and under	55.00
Rails, random lengths	50.00
Rails, rerolling	*65.00*
Angles, splice bars	50.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	*30.00-31.00*
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	45.00-46.00
Structurals & plates	44.00-45.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	38.00-39.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	41.00-42.00
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	52.00-53.00
Rails, rerolling	63.00-64.00
Rails, random lengths	*47.00-48.00*
Angles, splice bars	*45.00-46.00*

PHILADELPHIA

No. 1 heavy melting	*45.00*
No. 2 heavy melting	*39.00*
No. 1 bundles	*47.00*
No. 2 bundles	29.00
No. 1 busheling	*47.00*
Electric furnace bundles	*48.00*
Mixed borings, turnings	21.00-22.00†
Short shovel turnings	*27.00*
Machine shop turnings	24.00
Heavy turnings	35.00†
Structurals & plates	*48.00-50.00*
Couplers, springs, wheels	48.00
Rail crops, 2 ft & under	64.00

Cast Iron Grades

No. 1 cupola	*46.00†*
Heavy breakable cast	48.00
Drop broken machinery	54.00
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	32.00-33.00
No. 2 bundles	21.00-22.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.50-37.50
No. 2 heavy melting	31.50-32.50
No. 1 bundles	36.50-37.50
No. 2 bundles	26.00-27.00
No. 1 busheling	36.50-37.50
Machine shop turnings	18.00-19.00
Mixed borings, turnings	18.00-19.00
Short shovel turning	20.00-21.00
Cast iron borings	19.00-20.00
Low phos., 18 in.	47.00-48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable cast.	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths.	49.00-50.00

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	39.00
No. 2 heavy melting	*35.00-36.00*
No. 2 bundles	25.00-26.00

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	*35.00*
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	33.00-34.00
No. 1 busheling	33.00-38.00
Machine shop turnings	11.00-12.00
Short shovel turnings	13.00-14.00
No. 1 cast	37.00-38.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	38.00-38.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.50-37.50
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	39.50-40.50
No. 2 bundles	23.00-24.00
No. 1 busheling	35.50-36.50
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*18.00-19.00*

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Stove plate	*37.00-38.00*
Heavy breakable	*36.00-37.00*
Unstripped motor blocks	*31.00-32.00*
Charging box cast	*36.00-37.00*
Clean auto cast	*47.00-48.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00-33.00
No. 1 bundles	25.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00-39.00*
No. 2 heavy melting	36.00*
No. 1 bundles	33.00
No. 2 bundles	20.00
Machine shop turnings	16.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

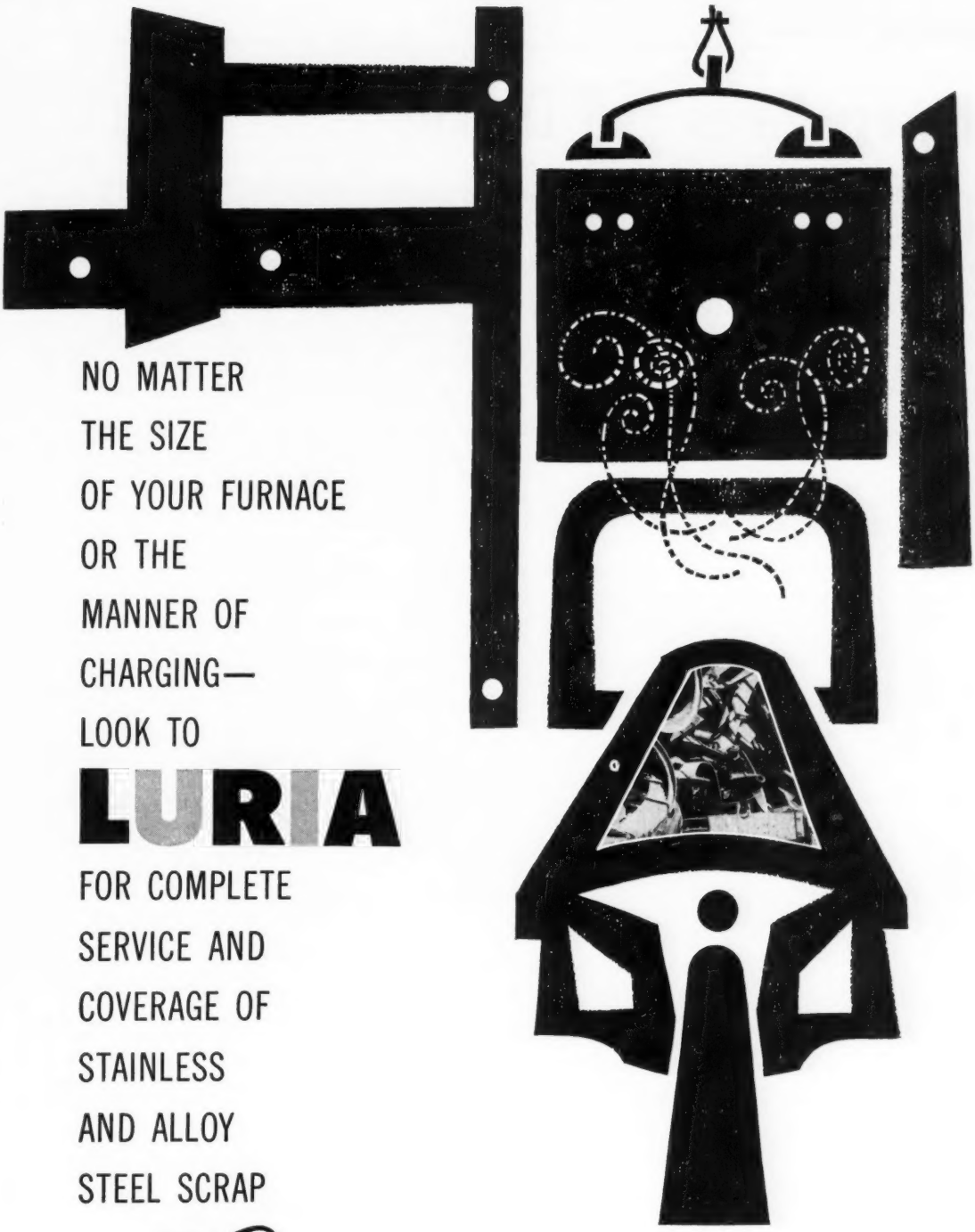
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.



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Congress Faces Full Docket

Western legislators are promising they will take a serious look at ways to aid the domestic industry when next session reconvenes. Here's a rundown on what to expect

Nonferrous Metal Prices, Pages 210 & 211

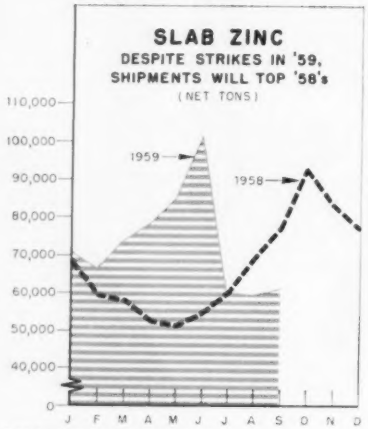
MINE STATE LEGISLATORS will be keeping close tabs on what goes on in nonferrous metals through this year. If they don't think the picture has improved substantially by Jan. 6 when Congress reconvenes, look for a rash of moves to help miners and fabricators.

Rep. Wayne N. Aspinall (D., Colo.), chairman of the House Interior Committee, has warned that the lead-zinc quota system "will be on trial for the next three months as far as Congress is concerned." If the industry can't boast greater production at higher prices by then, one of the first actions by Congress will be consideration of legislation to raise tariffs.

• **On the Docket**—When congressmen start looking into the backlog of bills left over from the first session of the 86th Congress, they'll find a host of proposals to grant relief to domestic miners and fabricators. For instance, there's H. R. 8860 and H.R. 8871 designed to aid the small lead-zinc miner through government payment of a differential between a "stabilized" price and the market price for up to 5000 tons a year of both metals. Another bill calls for subsidy payments to fluorspar producers.

• **Sure to Be Rehashed**—One subject that's certain to command a lot of attention is the establishment of a national minerals program. In the closing days of the first session of the 86th Congress, legislators passed H.R. 177 which was mainly significant in that it stated the intent of Congress to maintain a "sound and healthy" domestic mining industry.

Still pending is S.1537, sponsored by Sen. Gordon Allott (R., Colo.), which would have the secretary of the interior report to Congress at least once a year and recommend legislation to: 1. Develop a sound and stable domestic mining and minerals industry. 2. Develop domestic mineral reserves and resources necessary to meet industry and security needs. 3. Promote the wise and sufficient use of mineral resources through research programs.



Source: American Zinc Institute Inc.

• **Many Plans** — Almost everyone concerned with the industry has a plan. For example, Colorado's governor, Steve McNichols, has suggested a quota system among nations of the Free World to share markets for metals. His philosophy: Tariffs and other import controls have not answered the industry's problems. Sen. James E. Murray (D., Mont.) wants stronger import curbs. Others call for greater tax relief for exploration expenses and subsidies for not mining newly developed reserves.

Few students of the mining scene would argue that the industry is not beset with severe problems, many of them not of its own making, and that some type of assistance from the government is needed. But the approach so far has been to snipe at the problem with a shotgun in the hope that one of the pellets will score a bull's-eye. And if you can take Congressional talk to the home folks seriously, mine state legislators are oiling up the scattergun for a fresh crack at the target soon after they reconvene.

Perhaps the lack of agreement on the proper approach is due in part to the absence of any real concern on the part of the administration which is opposed to disturbing "normal" trade relations with friendly countries but at the same time has offered no alternate plan.

• **What's Ahead**—As things stand, you can look for strong efforts to push through legislation either restricting imports or raising tariffs, perhaps both. Congress will get the Tariff Commission's recommendations on the lead-zinc import situation by Mar. 31. Since it has reported "injury" twice before, there is no reason to believe the findings will be reversed this time. That is why, say some congressmen, they may not wait for the commission's report before recommending legislation.

NONFERROUS PRICE RECORD

	Oct. 14 Price	Last Change	Previous Price	Sept. Avg	Aug. Avg	Oct., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	30.00-33.00	Aug. 31, 1959	30.00	31.500	30.010	25.058
Lead	12.80	Aug. 24, 1959	11.80	12.800	12.069	12.437
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.375	Oct. 14, 1959	102.50	102.440	102.333	96.500
Zinc	12.00	Sept. 21, 1959	11.00	11.360	11.000	10.865

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.40 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00-31.50 deld.; custom smelters, 33.00; lake, 31.50 deld.; fire refined, 29.75-31.25 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $224-226 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.375.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.00-3.80.

Zinc: Prime western, 12.00; brass special, 12.25; intermediate, 12.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 13.25; special high grade, 13.50 deld. Diecasting alloy ingot No. 3, 15.25; No. 2, 15.75; No. 5, 15.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.50; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.85; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.85
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.) across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¼ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 10.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-23.75; No. 2 heavy copper and wire, 21.50-21.75; light copper, 19.50-19.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 31.50c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.63b	52.86c	....	55.82	27.500	27.500	26.750
Yellow Brass	48.65	34.21d	49.19	52.06	21.000	20.125	19.125
Low Brass, 80%	51.48	51.42	52.02	54.79	23.500	23.250	22.750
Red Brass, 85%	52.48	52.42	53.02	55.79	24.375	24.125	23.625
Com. Bronze, 90%	54.02	53.96	54.56	57.08	25.250	25.000	24.500
Manganese Bronze	57.00	50.68	61.12	....	19.750	19.500	18.875
Muntz Metal	51.35	46.66	....	....	19.875	19.625	19.125
Naval Brass	53.29	47.10	59.85	56.70	19.625	19.375	18.875
Silicon Bronze	60.67	59.86	60.21	78.35	27.000	26.750	26.000
Nickel Silver, 10%	64.13	66.46	66.46	....	25.875	25.625	12.812
Phos. Bronze	75.34	75.84	75.84	77.02	28.625	28.375	27.375

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.50-17.75; new brass clippings, 15.50-16.00; light brass, 12.00-12.50; heavy yellow brass, 13.00-13.50; new brass rod ends, 13.50-14.00; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 14.75-15.25; brass pipe, 15.00-15.50.

Lead: Soft scrap lead, 8.50-9.00; battery plates, 4.25-4.50; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9.25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.50; light copper 22.50; refinery brass (60% copper) dry copper content, 24.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.50; light copper, 22.50; No. 1 composition borings, 21.50; No. 1 composition solids, 22.00; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.40.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 41.00, 2000-5000 lb lots; cast, 43.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 19.50; flat tops, 19.50; flats, 22.25; ovals, 21.50, ton lots.

WANTED

CORRUGATED GALVANIZED STEEL ROOFING

22 ga., 24 ga. and 26 ga. New, unstained. Up to 80 tons. All or part. Give sizes, quantities, price and location. Can also use 4", 5", 6", 8" and 10" structural steel channels; 7", 8", 10", 14" I-beams.

WINSTON STEEL WORKS
WEST SACRAMENTO, CALIF.

WANT TO BUY

Steel By-Products Discs

2" to 2½"	Dia.	.060 to .125
4½"	Dia.	.060 to .125
6½" to 10"	Dia.	.060 to .125
11" to 12½"	Dia.	.085 to .095

Hot or Cold Rolled

KEYSTONE LAMP MFG. CORP.
Purchasing Department
Tel. Slatington, Pa. PO 7-3821

PRESSES WANTED

One press or entire stamping or forging plant. Write or phone in confidence.

WENDER PRESSES INC.
11205 French Rd. Detroit 34, Mich.
WA 5-1172

FOR SALE

1 Mill Type Bldg. 600'0 x 78'0 with 25-5 Ton Overhead Crane, 65'0 cc of Rails, Lift 50'0.

1 Mill Type Bldg. 382'0 x 67'0 with 15 Ton Crane, 65'0 cc of Rails, Lift 47'0.

1 Crane Runway 500'0 x 55'0 with 15 Ton Overhead Crane, 50'0 cc of Rails, Lift 47'0.

Will sell all or part.

Reply Box 795, STEEL
Penton Bldg. Cleveland 13, Ohio

OLD ESTABLISHED, MEDIUM SIZED, LIGHT MFG. CO. WITH NATIONAL SALES: WOULD LIKE TO ACQUIRE A SMALLER CO. WITH A PRODUCT WHICH IS SOLD TO INDUSTRY.

CALCULAGRAPH CO.
HARRISON, N. J.

For Sale . . . in Whole or Piecemeal

COMPLETE CHEMICAL BY-PRODUCTS PLANT

Koppers Coke Ovens
Quenching Cars and Locomotives
Pusher and Leveler Cars
Coal Crushing and Washing Equipment
Coal Handling and Mixing Equipment
Coal Stocking Bridge
Conveyors and Guides
Acid Regenerating Plant
Benzol Stills for Crude and Finished Products
Coolers, Scrubbers and Piping for Gas
Turbo Exhausters
Naphtha and Ammonia Tanks
Miscellaneous Storage Tanks
3125 KVA Frequency Changer
Piping and Valves

All equipment and spare parts from 280 ovens. Plant is presently complete. Nothing removed. Formerly owned, operated and maintained by U. S. Steel Corporation and known as Joliet Coke and Chemical Works. Recently shut down.

WRITE OR WIRE

M. S. KAPLAN COMPANY
231 So. La Salle Street
Chicago 4, Illinois

Exclusive Sales Agents for Present Owners
ANdover 3-3900
Joliet phone: 7-4469

CLASSIFIED ADVERTISING

Help Wanted

A centrally located steel plant is in need of a man with Hot and Cold Strip experience and some melting, with ability to accept supervisory responsibilities with opportunity for later promotion to top level management. Prefer man age 50 years or under. All replies will be kept confidential and should include complete information concerning age, educational background, employment history and salary expected. Reply Box 792, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of STEEL.

Help Wanted

METALLURGIST: Due to the demand by Pennsylvania industries for educational services The Pennsylvania State University has an administrative staff opening for a college graduate with background as follows: ferrous metallurgist, with production experience. Responsibilities include the organization of technical classes and supervision of metallurgical education programs, but do not include teaching. Some travel is required. Write, Employment Division, 304 Old Main Building, The Pennsylvania State University, University Park, State College, Penna.

Positions Wanted

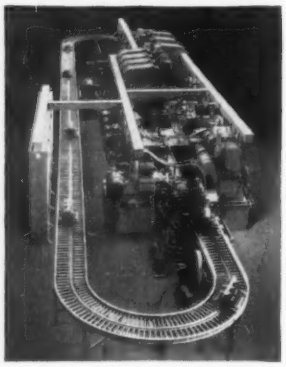
ELECTRIC FURNACE MELTER with 24 years in melting and handling high grade alloy and stainless steels. Salary open. Age 45. Reply Box 794, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL *from Wheelock, Lovejoy*
BULLETIN

W-L DETROIT For the first time, HY-TEN D-2 air hardening steel now available here in rounds, squares, flats and billets. Also a fine stock of standard alloy grades, especially A-8620, as well as all HY-TEN grades. Excellent service from our new warehouse.

W-L CHICAGO Steady demand for "B" No. 3X for flame-hardened parts such as boring bars. Good stocks of HY-TEN AIS — the best carburizing alloy steel, and freest machining available today—a new W-L exclusive!

W-L CINCINNATI This 23-station Avey Line-O-Dex transfer machine, designed and built by The Avey Division of Motch & Merryweather Machinery Co., Cincinnati, Ohio, is equipped with spindles made of our HY-TEN "B" No. 2. This grade was chosen for its great tensile strength (100,000 P. S. I. in the natural condition), toughness, and fine wearing qualities.



W-L CAMBRIDGE We are now distributing FLEXANGLE, the easy-to-erect structure assembly for all types of racks, shelves, platforms, etc. It's completely universal and low in cost — can be used anywhere, by anyone, for any storage purpose.

W-L HILLSIDE Our stock of flat and square sizes in HY-TEN M Temper Oil Hardening Steel can save you time and money in your tooling program. HY-TEN "B" No. 3X pre-heat treated in rounds, squares and flats available in a wide range of sizes. Billets on hand for hammer forging in all grades of HY-TEN.

W-L CLEVELAND Excellent stock of brake die flats and squares. Also many sizes up to 16" x 18" in HY-TEN Mold Steel. Excellent deliveries.

W-L BUFFALO A wide range of rounds and hexagons in cold drawn AISI leaded and non-leaded A-4140. Also many sizes of the new "B" No. 3X-40 in rounds and hexagons.

Write our Cambridge office today for your *free* Wheelock, Lovejoy Data Sheets. They'll give you complete technical information on grades, applications, physical properties, tests, heat treating, etc.

WHEELOCK, LOVEJOY & COMPANY, INC.
132 Sidney Street, Cambridge 39, Mass.

AMERICAN STEEL WAREHOUSE ASSN

AGENTS: Southern Engineering Company, Charlotte, N. C.; Sanderson-Newbould, Ltd., Montreal & Toronto

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IT PAYS TO HAVE GOOD CONNECTIONS
HUBBELL

Manufacturers of Cold Headed Fasteners Since 1888

Hubbell has the capacity to produce and deliver on time the finest quality standard or special fasteners in the quantity required up to a maximum diameter of ⅜". This statement is backed by the facilities listed here and supported by over 70 years' experience in cold heading.

COLD HEADING

Each operation is quality controlled to insure high quality and precision.

SLOTTING

Mass production is maintained without sacrificing accuracy or quality.

THREAD ROLLING

TURNING POINTING

The use of our engineering service offers the ultimate in engineering know-how.

DRILLING TAPPING

Prices and delivery on request. Simply send blueprint and/or sample of the item.

PLATING HEAT-TREATING

QUALITY CONTROL

HARVEY HUBBELL, INCORPORATED

Machine Screw Dept. Bridgeport 2, Conn.

SPS RELIABILITY / *A dynamic standard of predictable performance*

SPS Nuclear Division receiving inspector uses ultrasonic probe—comparable in a sense to radar—to verify absence of internal flaws in precision forging destined to become part of reactor vessel closure head in nuclear-powered submarine.

Pre-induction physical for a reactor component

Steel received by the SPS Nuclear Components Division is already a pretty sophisticated material. It comes from one of the few mills qualified to meet certain rigid Government specs. It is accompanied by a detailed affidavit of analytical tests—physical, chemical, ultrasonic, macro, intergranular, stepdown—conducted under the surveillance of both military and SPS field inspectors.

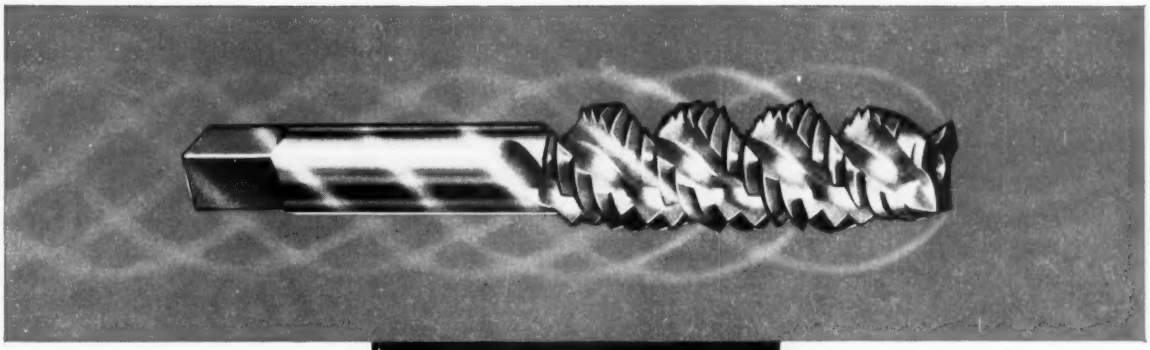
Nevertheless, the as-received material is considered by SPS to be merely a candidate for machining. New specimen slugs are cut; all tests are performed again—under the strict control of SPS laboratories, a facility unequaled in the industry. Following laboratory approval, a requirement never deviated from, the forging is serialized, assigned an individual record folder, and released to production.

And this is just the beginning. Every dimension of every part is recorded during manufacture (only SPS takes the trouble to compile this in-process data). Then when the part is finished, all records are put aside, and every dimension is rechecked—an operation that may take up to 6 hours and involve hundreds of measurements, many to ±.0005 inch.

Why these extraordinary precautions? Simply because these parts must function with absolute reliability, oftentimes in inaccessible locations. If you have requirements for such components (for reactors or for conventional power-producing machinery), contact SPS—manufacturer of precision threaded fasteners and allied products in many metals, including titanium. Request new Folder 2499.

NUCLEAR COMPONENTS Division **SPS**

JENKINTOWN 33, PENNSYLVANIA



TURBO-CUT

the tap that's changing the meaning of "high production"

The reports we're getting from our field men on Turbo-Cut Taps performance are self-explanatory.

Here's a sample from one day's mail:

"This tap was run on an aluminum carburetor part and started to run undersize after 32,160 holes."

"We currently have a 5/16-24 Turbo-Cut that is still going after 18 shifts and over 43,000 holes."

"A #10-24 Turbo-Cut plug tap ran 18,200 holes on a zinc die cast job."

Threadwell's Turbo-Cut is piling up records like these daily. Every plant interested in increased production should take a look at the tap that really means "high production". See your Threadwell Distributor now for details.

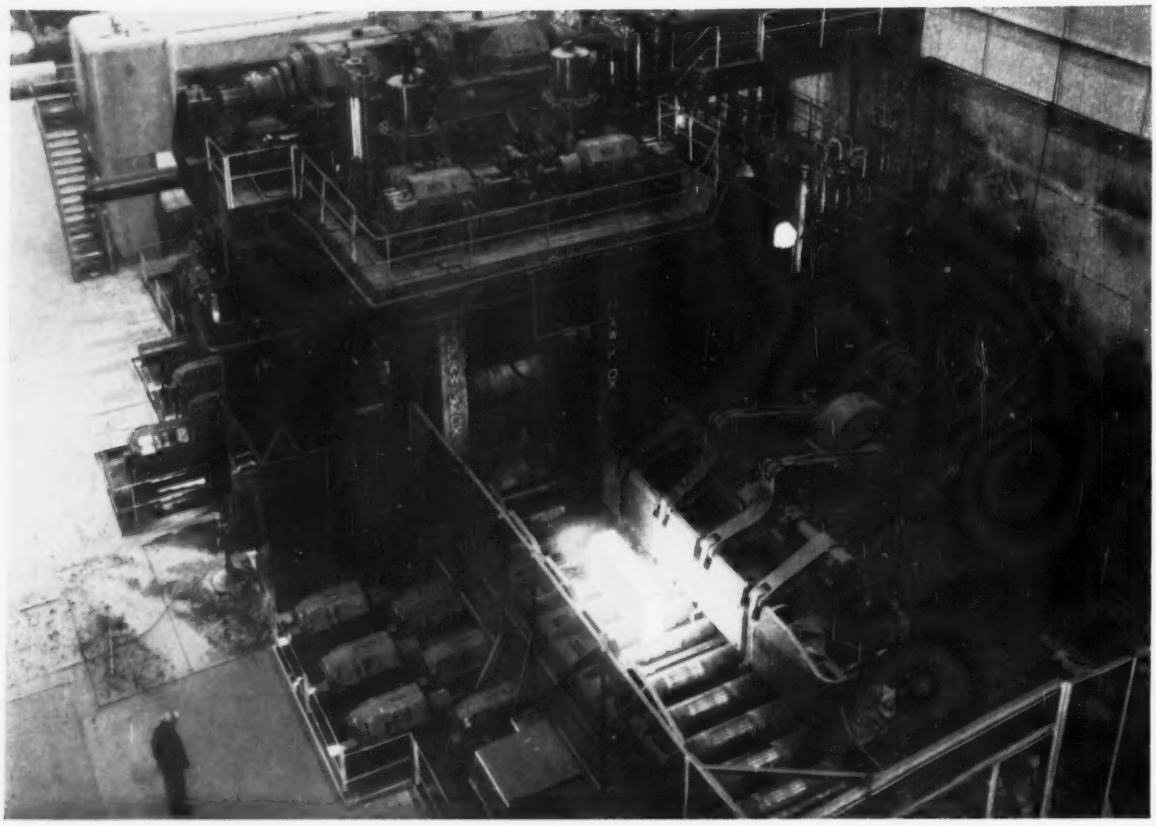
Only Threadwell makes the genuine Turbo-Cut.

Threadwell
MAKES THE BEST PRODUCT BETTER

INDUSTRIAL DISTRIBUTORS — SERVING INDUSTRY ECONOMICALLY — THE RIGHT HAND OF PRODUCTION

THREADWELL TAP & DIE CO.
GREENFIELD, MASSACHUSETTS

Stocking Warehouses: New York — Cleveland
Detroit — Los Angeles — Greenfield, Mass.



Time, power, maintenance saved on Blaw-Knox two-high slabbing mill

BLAW-KNOX wanted to be sure this new 46″ x 90″ 2-high slabbing mill would work steadily, economically, under tremendous shock loads. They mounted roll necks, screwdowns, edger, edger drives, table drives and table line shaft on Timken® tapered roller bearings.

Result: *Less downtime* in roll changes; the Timken bearings and roll assembly can be removed easily as a unit; *low starting resistance* and less power required because Timken bearings practically eliminate friction; *reduced maintenance* on screwdown and breaker block, because Timken bearings hold the upper roll in place, eliminating the "jump" when slab or bloom enters the mill.

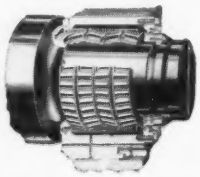
More than 1,000 mill installations the world over use Timken roll neck bearings, 1) *To roll the load*—virtually eliminate friction. Timken bearings have tapered design to take both radial and thrust loads. 2) *Minimize maintenance:* Modern Timken roll neck bearings are designed to provide the best combination of bearing capacity, rigidity and roll neck strength for a given mill roll diameter. Bearings and roll necks stand up longer under load. Grease or oil mist lubrication provides further economies. And, 3) *give longer bearing life.* Mill records show that service life of Timken back-up roll bearings has been obtained in excess of 12,000,000 tons of steel rolled. They're case-carburized to take shock and the full-line contact between rollers and races gives them extra load-carrying capacity.

For the best bearing performance and engineering service when you build or buy a mill, specify Timken tapered roller bearings. They make any machine better. ***When you buy Timken® bearings you get...*** *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.* Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings



First in bearings for 60 years